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Final

Phase II
Remedial Investigation Interim Report for Operable Unit 14, Site 90

Marine Corps Air Station
Cherry Point, North Carolina

Prepared for

Department of the Navy
Naval Facilities Engineering Command
Atlantic

Contract No. N62470-95-D-6007
CTO-0209

June 2005

Prepared by

CH2MHILL

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Under the

LANTDIV CLEAN II Program
Contract N62470-95-D-6007

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Acronyms and Abbreviations

µg/L	micrograms per liter
°C	degrees centigrade
bgs	below ground surface
BTEX	benzene, toluene, ethylbenzene and xylenes
CVOC	chlorinated volatile organic compound
DO	dissolved oxygen
ERA	ecological risk assessment
HHRA	human health risk assessment
MCAS	Marine Corps Air Station
MCL	Maximum Contaminant Levels
mg/L	milligrams per liter
mS/cm	milli-Siemens per centimeter
MTBE	methyl-tert-butyl ether
mV	millivolts
MW	monitoring well
NADEP	Naval Aviation Depot
NC2L	North Carolina 2L Groundwater Standards
NPL	National Priorities List
NTU	Nephelometric Turbidity Unit
ORP	oxidation-reduction potential
OU	Operable Unit
PCE	tetrachloroethene
PRG	Preliminary Remediation Goals
RI	Remedial Investigation
SMCL	Secondary Maximum Contaminant Levels
TCE	trichloroethene
TCL	Target Compound List
UST	underground storage tank
VOC	volatile organic compound

SECTION 1

Introduction

This report describes the results of Phase II Remedial Investigation (RI) data collection activities at Operable Unit (OU) 14, Site 90, and presents the proposed Phase III sampling activities to fill identified data gaps. The Phase II investigation activities were performed to further delineate the concentrations and extent of chlorinated volatile organic compounds (CVOCs) in the surficial aquifer identified during the Phase I investigation (CH2M HILL, 2003)—see **Appendix A**—and historical data collected as part of the Marine Corps Air Station (MCAS) Cherry Point underground storage tank (UST) program (**Appendix B**). The October 2003 activities described in this document were completed in accordance with the RI Work Plan (CH2M HILL, 2002) for OU14 at MCAS Cherry Point, North Carolina. Initially, two phases of investigation were proposed to confirm and delineate the presence of CVOCs in groundwater at OU14. Upon completion of the Phase I field investigation, data from ongoing groundwater monitoring (as part of the UST program in the vicinity of Tank Farm A, north and west of OU14) was made available to the OU14 RI team. These data, along with the results of the Phase I sampling, indicate that CVOCs are present in groundwater to the north and west of the original site boundaries and the Phase I investigation area. Consequently, comprehensive groundwater sampling was performed (Phase II) utilizing existing monitoring wells (MWs) screened in the upper and lower portions of the surficial aquifer at OU14 and vicinity.

The objective of the Phase I investigation was to determine the preliminary extent of CVOC contamination in the groundwater at OU14 in advance of a Phase II investigation. As discussed above, the Phase II investigation was used to delineate the extent of CVOC contamination in groundwater within the expanded study area. A Phase III investigation will be conducted to fill data gaps identified from the first two investigation phases and to collect site information to assist with evaluating potential remedial alternatives.

The overall objectives of the RI at OU14, Site 90, are to:

- Determine the nature and extent of CVOC groundwater contamination that may be associated with former non-petroleum sources in the OU14 area
- Obtain sufficient data to support a human health risk assessment (HHRA)

An ecological risk assessment (ERA) does not appear to be warranted because of a lack of receptors. The site is entirely paved over with concrete; however, exposed ground surface and surface water are present northwest of the site in areas beyond the current extent of the investigation. For the sake of completeness, the RI Report for OU14, Site 90, will include a section entitled "Ecological Risk Assessment."

The results of the Phase II investigation activities and recommendations for further investigation are presented in this report.

SECTION 2

Site Description and History

2.1 Site Description

MCAS Cherry Point is a 13,164-acre military reservation located adjacent to the City of Havelock in southeastern Craven County, North Carolina. MCAS Cherry Point provides support facilities and services for the Second Marine Aircraft Wing, the Naval Aviation Depot (NADEP), Service Support Detachment 21 of the Second Force Service Support Group, the Naval Air Maintenance Training Group Detachment, and the Defense Reutilization and Marketing Office. MCAS Cherry Point maintains facilities for training and for supporting the Atlantic Fleet Marine Force aviation units and is designated as a primary aviation supply point.

The boundaries of MCAS Cherry Point include the Neuse River to the north, Hancock Creek to the east, North Carolina Highway 101 to the south, and a boundary approximately ¾ mile west of Slocum Creek. **Figure 2-1** shows the general layout of MCAS Cherry Point.

OU14, Site 90, consists of the area including and surrounding Building 130, which is located in the west-central portion of the MCAS Cherry Point base flight-line complex, adjacent to Sixth Avenue (**Figure 2-2**). Building 130 is a large aircraft hangar that is approximately 450 ft long and 250 ft wide. The hangar consists of two large aircraft bays, storage rooms, and administrative offices. A broad expanse of concrete tarmac generally surrounds the building and extends northward and eastward to aircraft taxiways and runway 14L. A concrete airplane wash rack and small outbuildings are located adjacent to the southeast side of the building. Portions of an abandoned underground aviation pipeline surround Building 130. This pipeline network was previously used to refuel aircraft at multiple fueling stations. The only surface features that indicate the location of the abandoned pipeline network are two manhole covers, which provide access to pipeline junction vaults; the manholes are located in the two parking lots on the northwest and southeast sides of Building 130 near Sixth Avenue.

The airplane wash rack, located near the southeast side of Building 130, was apparently used to wash aircraft and related equipment since the construction of Building 130 in the early 1940s. The wash rack is currently used to flush aircraft fuel drop tanks with water. The wash rack drains to a diversionary catch basin (located near Sixth Avenue) that is connected to the industrial sewer system. Portions of the sewer system are reportedly constructed of clay pipe, which can crack and break with age. Also, Building 3745 is located adjacent to the wash rack and is used as a hazardous waste accumulation area. Building 1700, an aircraft maintenance hangar, is located southeast of (and potentially upgradient of) the OU14 area.

Numerous underground utility lines and features are located within the project area, including sanitary sewer, storm water, water, steam, communication lines, fuel lines, electrical lines, and USTs.

2.2 Site History

MCAS Cherry Point was commissioned in 1942. A massive aircraft assembly and repair facility, which later became the NADEP, was added in 1943. Hazardous wastes have historically been generated through aircraft assembly and maintenance operations. These wastes include plating wastes, organic solvents, paint removers and cleaners, oils and lubricants, waste petroleum, and polychlorinated biphenyls. The air station was placed on the federal National Priorities List (NPL) in December 1994. Currently, the investigation and remediation process is ongoing at several OUs.

According to building construction drawings, Building 130, located within OU14, was constructed in the early 1940s to house and maintain seaplanes. The underground aviation pipeline network that surrounds the hangar was apparently constructed during this period and was expanded several times before its abandonment. Records concerning when and how the pipeline system was abandoned are not available (Law Engineering, 1995).

The underground pipeline system includes two 12-in.-diameter and one 4-in.-diameter pipelines that run adjacent to Sixth Avenue. The main pipelines branched off to multiple fueling stations, primarily located near the northeast, southeast, and northwest sides of Building 130. Another run of abandoned pipeline is located northwest of Building 130 and branches off to individual refueling stations in this area. The overall pipeline system consisted of several miles of pipeline, which was connected to Tank Farm A, located approximately 600 ft northwest of Building 130.

An addition to the southwest side of Building 130 was constructed in the 1950s (estimated) over a portion of the abandoned pipeline adjacent to Sixth Avenue and over a suspected lubrication oil/waste oil UST of unknown size that is assumed to have been abandoned in place. An addition to the northeast side of the building was also apparently constructed at this time over another suspected UST that is assumed to have been abandoned in place (a 1944 base construction drawing shows these USTs).

The aircraft wash rack was reportedly constructed at the same time as Building 130. The history related to Building 4438 (hazardous material accumulation area) is not clear. Building 4438 is located between the aircraft wash rack and Building 3745.

Both petroleum-related compounds and CVOCs have been detected in groundwater beneath OU14, Site 90. The petroleum-related contamination consists primarily of benzene, toluene, ethylbenzene, and xylenes (BTEX), as well as semivolatile organic compounds, including naphthalene. This petroleum-related contamination is currently being addressed under the MCAS Cherry Point UST Program. Because of the presence of CVOCs in groundwater, Site 90 was identified as a new site in 1999 for inclusion in the Installation Restoration Program for MCAS Cherry Point. The exact pathway of the CVOCs from suspected sources to the groundwater is not definitively known because of the lack of positively identified CVOCs in the unsaturated zone. The wash rack of Building 130, however, is the likely source for some CVOCs detected in groundwater at OU14.

2.3 Geology

The information in the geology and hydrogeology sections was taken from "The Final Remedial Investigation for Operable Unit 1 (OU1)" (Tetra Tech NUS, Inc., 2002) and is in agreement with geologic data collected from OU14.

Beneath fill material, the four uppermost geologic formations are the undifferentiated surficial deposits, the Flanner Beach Formation, James City Formation, and the Yorktown Formation.

The fill material consists of reworked natural materials such as sand, silt, and clay, which are mixed with wood fragments in some areas. Generally, the fill material is found in areas of construction and buildings. It is believed to be the result of the construction activities and is less than 10 ft thick.

The materials that make up the undifferentiated and Flanner Beach Formation consist of unconsolidated orange, yellow, and brown sand interlayered with peat, silt, and clay in localized areas. These materials underlie the fill or are present at the ground surface where fill is nonexistent and extend to a depth of approximately 40 to 50 ft below ground surface (bgs). A layer of coarse sand with abundant shell fragments commonly marks the base of the Flanner Beach Formation.

The James City Formation consists of unconsolidated olive-green to grayish-green, dense, clayey, sandy silt with locally discontinuous, thin beds of silty clay and varying amounts of bivalve shell fragments. The observed thickness of the James City Formation ranges from 0 to 25 ft and averages approximately 10 ft. Evidence of channeling in parts of MCAS Cherry Point is believed to have eroded this formation considerably in localized areas.

The Yorktown Formation underlies the James City Formation. The upper Yorktown Formation consists of unconsolidated silty sand with varying amounts of bivalve shell fragments. The bottom part of the formation consists of clayey sand that makes up a part of the Pungo River confining unit.

2.4 Hydrogeology

The three uppermost hydrogeologic units are the Surficial Aquifer, the Yorktown Confining Unit, and the Yorktown Aquifer.

The surficial aquifer thickness averages 40 ft, and it has been divided into the upper and the lower surficial aquifer because of differences in permeability (which increases with depth) and to vertically characterize the aquifer with reasonable well screen lengths. The upper portion is generally 10 to 20 ft bgs, while the lower portion is approximately 20 to 50 ft bgs. The groundwater table ranges from 5 to 10 ft bgs. Groundwater in the upper portion of the surficial aquifer flows across OU14 in a northwestern direction at the southern part of the site and turns to a NNE direction at the northern part. Groundwater in the lower portion of the aquifer flows in a NNW direction. **Figures 2-3** and **2-4** illustrate potentiometric surfaces for the upper and lower portions of the aquifer, respectively, using groundwater elevation data collected during the Phase II RI investigation.

The draft OU1 feasibility study (CH2M HILL, in progress) describes localized water-table mounding at OU1-MW61 relative to other OU1 wells located to the south and southwest of OU14. This mounding is attributed to the presence of localized clay layers that are approximately 2 to 3 ft thick and are interlayered within the sand of the upper surficial aquifer. Shallow groundwater is described as moving radially away from this mounded area.

The hydraulic conductivities, as determined by slug tests, for the upper and the lower portions of the surficial aquifer at OU1 are 6.0 ft/day and 18.85 ft/day, respectively. The average hydraulic gradients, as determined from groundwater elevation data presented in **Figures 2-3** and **2-4**, for the upper and the lower portions of the surficial aquifer are 0.0025 and 0.0028 ft/ft, respectively. Assuming an effective porosity of 0.20 for the upper and 0.25 for the lower surficial aquifer, the groundwater flows at 27 ft/year in the upper portion and 77 ft/year in the lower portion.

Underlying the surficial aquifer is the Yorktown Confining unit, which is underlain by the Yorktown Aquifer. No borings have been placed through the confining unit into the Yorktown Aquifer at OU14, Site 90; therefore, this aquifer is not discussed further in this report.

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LEGEND
- Site Boundary
- Runway
- Buildings

N

0 2000 4000 Feet

Figure 2-1
Vicinity Map
OU14, Site 90
MCAS Cherry Point

CH2MHILL

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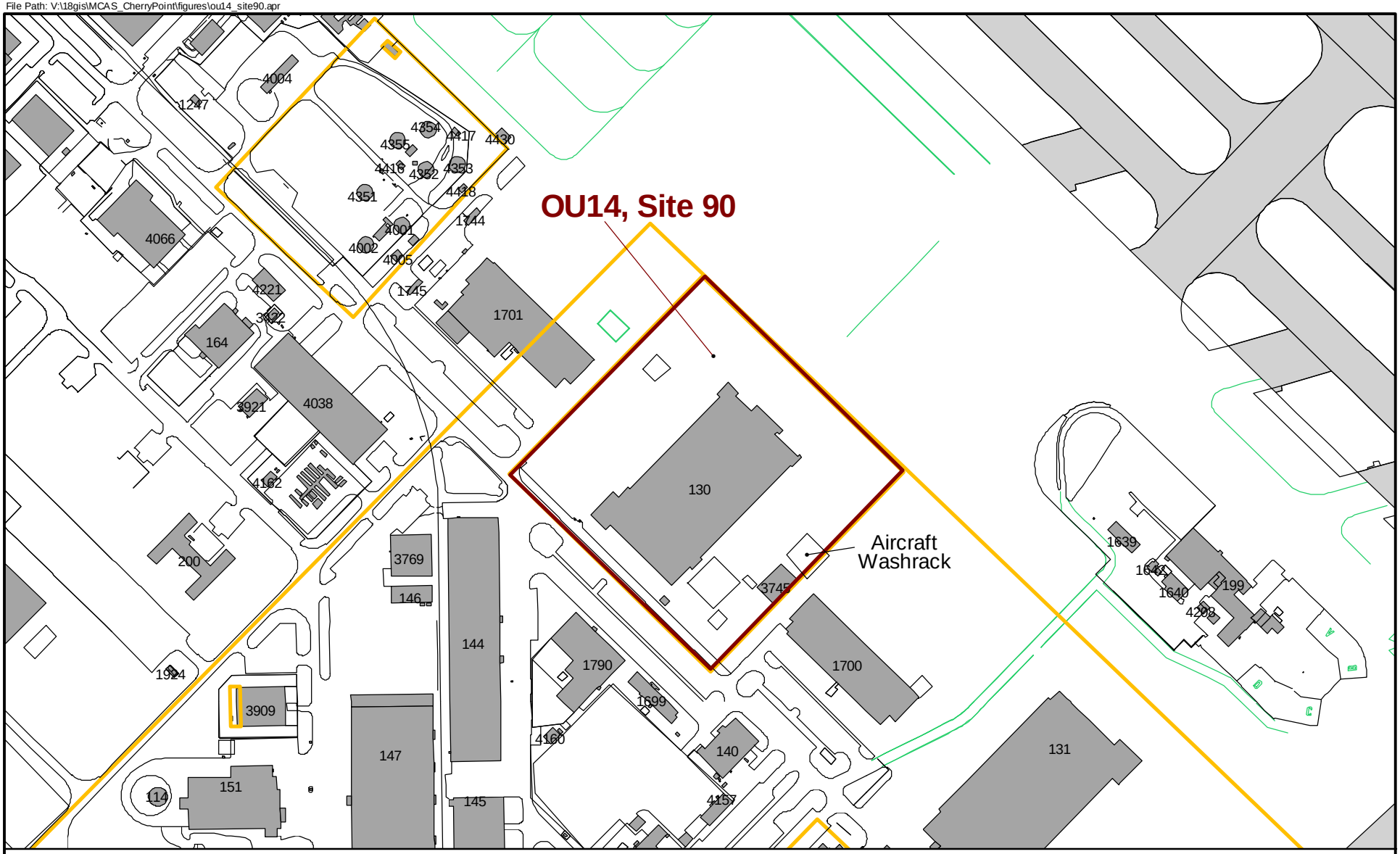

Figure 2-2
Site Map
OU14, Site 90
MCAS Cherry Point

CH2MHILL

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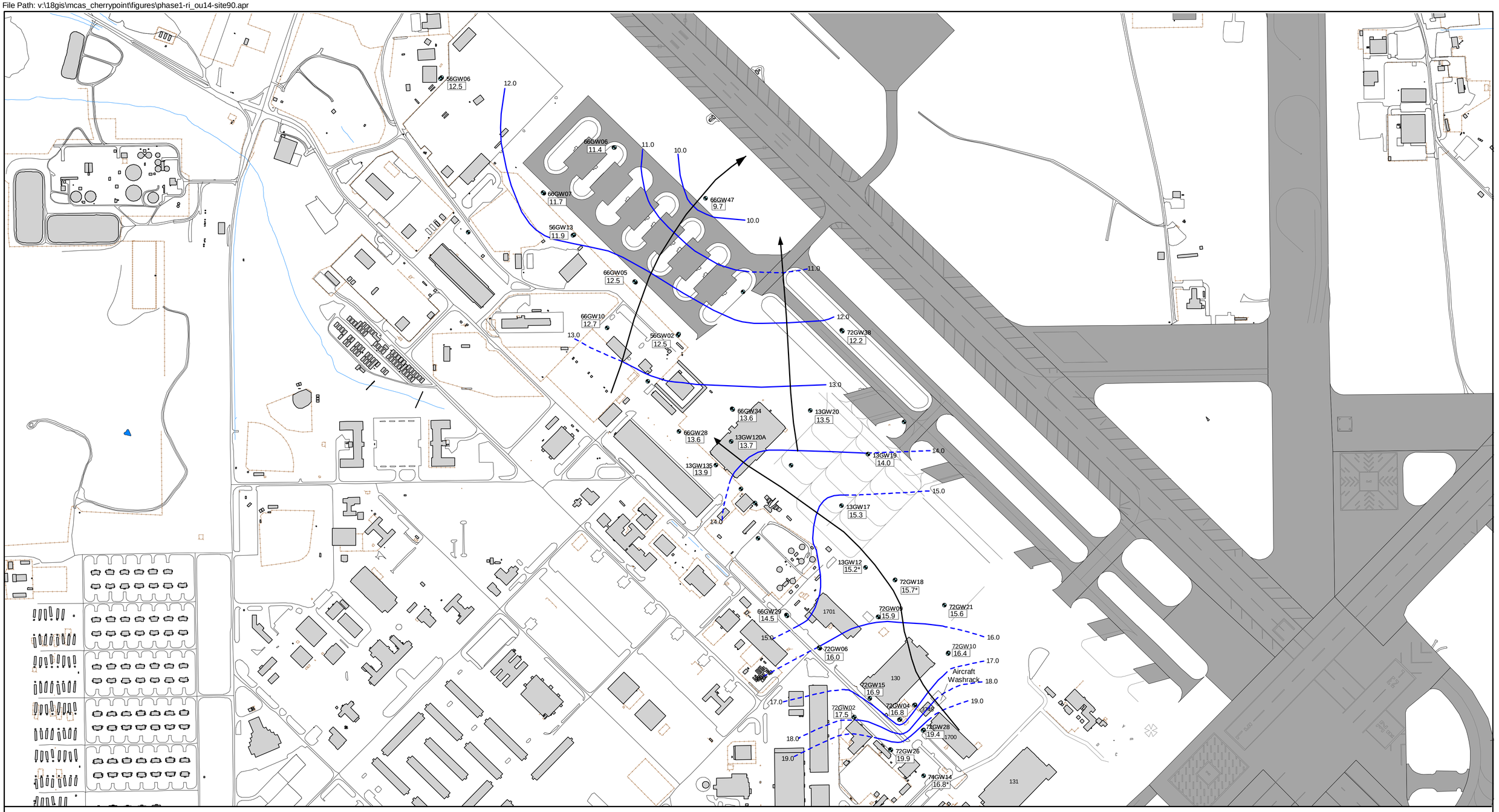

LEGEND

- Monitoring Well Locations
- 14.0 Monitoring Well Locations with Potentiometric Surface Elevation (Oct 2003)
- Potentiometric Surface Elevation Contour (ft amsl)
- Contour is inferred
- 13.0 Groundwater Elevations in Feet Above Mean Sea Level
- Groundwater Flow Direction

Contour interval = 1 ft

* Observed potentiometric surface elevation is inconsistent with site data and was not used when creating potentiometric surface map.

N

0 400 800 1200 Feet

Figure 2-3
Potentiometric Surface Map
Upper Surficial Aquifer, Oct 2003
OU14, Site 90
MCAS Cherry Point

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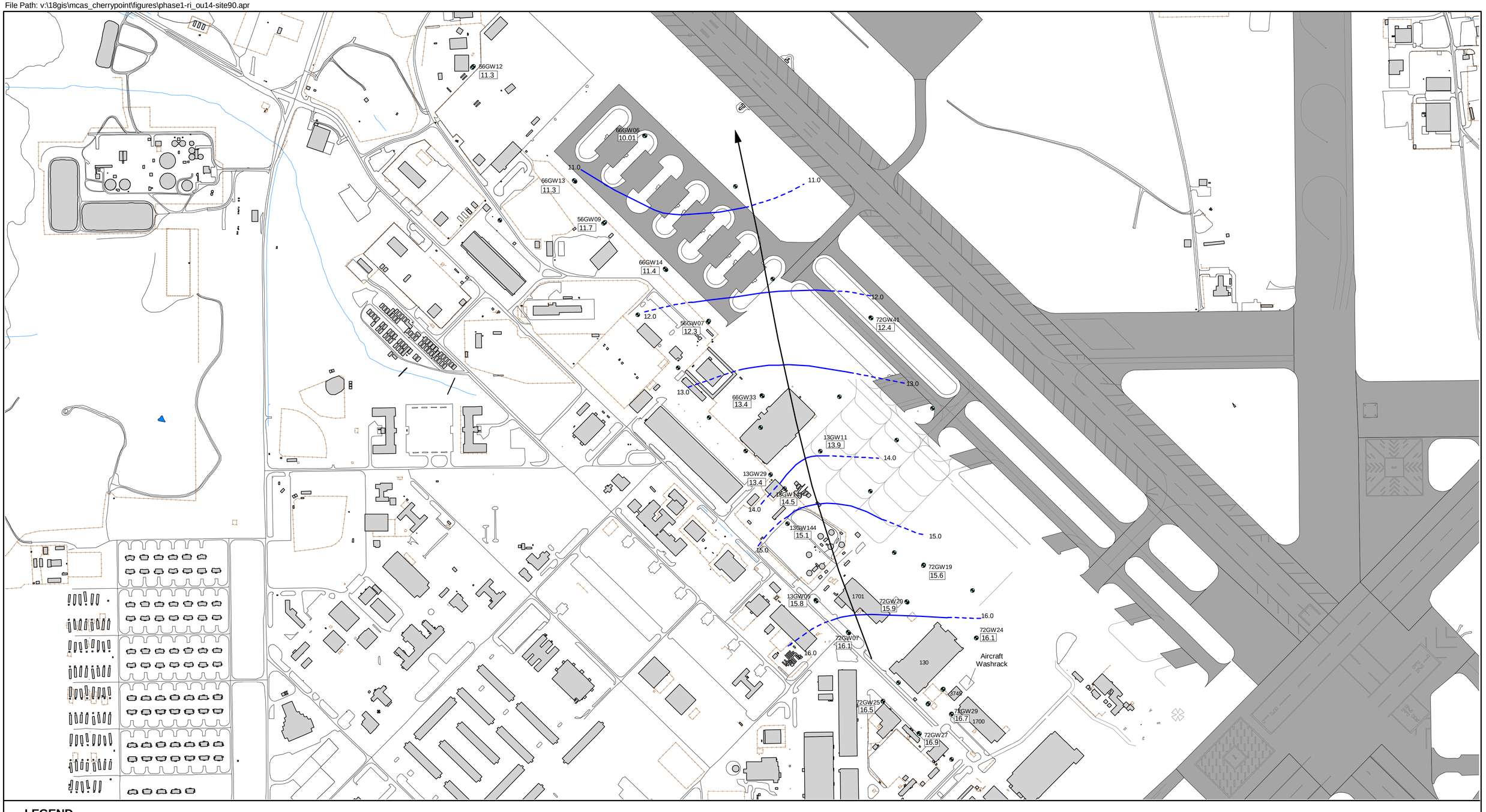

LEGEND

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- 14.0 Monitoring Well Locations with Potentiometric Surface Elevation (Oct 2003)
- Potentiometric Surface Elevation Contour (ft amsl)
- Contour is inferred
- 13.0 Groundwater Elevations in Feet Above Mean Sea Level
- Groundwater Flow Direction

Contour interval = 1 ft

* Observed potentiometric surface elevation is inconsistent with site data and was not used when creating potentiometric surface map.

N

0 400 800 1200 Feet

Figure 2-4
Potentiometric Surface Map
Lower Surficial Aquifer, Oct 2003
OU14, Site 90
MCAS Cherry Point

SECTION 3

Field Investigation of Groundwater Contamination

To further delineate the extent of the CVOC plume at OU14 identified during the Phase I investigation, a total of 55 existing surficial groundwater MWs were sampled (**Table 3-1** and **Figure 3-1**). MW groundwater samples were collected from each well utilizing a low-flow, peristaltic pump collection method in accordance with the standard operating procedures outlined in the Master Field Sampling Plan, MCAS Cherry Point, North Carolina (Brown & Root Environmental, 1998) and the Final Remedial Investigation Work Plan for OU14, Site 90 (CH2M HILL, 2002). All groundwater samples were submitted to an off-site laboratory for the analysis of Target Compound List (TCL) volatile organic compounds (VOCs), RCRA-8 metals, nitrate, and sulfate.

The groundwater samples were collected by lowering clean, disposable polyethylene tubing into the MW and setting the intake at the mid-screen interval. The wells were thoroughly purged until water quality parameters—temperature, turbidity, electrical conductivity, and pH—stabilized. The VOC samples were collected using the "straw method" – the disposable polyethylene tubing containing the representative groundwater sample was withdrawn from the MW and allowed to drain into the sample vials. The samples of RCRA-8 metals, nitrate, and sulfate were collected by pumping the groundwater directly into the specified sample containers using the peristaltic pump. All samples were shipped daily to a Navy-approved laboratory for analysis utilizing a 28-day turnaround time.

Groundwater elevations were measured in all permanent MWs prior to sampling. The results of the water level survey are presented in **Table 3-1**. Potentiometric surface maps were created from the groundwater elevation data collected in October 2003, and are shown in **Figures 2-3** and 2-**4**.

Table 3-1
Groundwater Elevations (October 2003)
Phase II Remedial Investigation
OU14 Site 90
MCAS Cherry Point

Well ID "Station"	Sample ID	DTW (ft-btoc) 3-Oct	TOC ft-amsl	GW Elev. ft-amsl
13GW05	OU14-13GW05-03D	8.97	24.79000	15.82
13GW11	OU14-13GW11-03D	9.87	23.77000	13.90
13GW12	OU14-13GW12-03D	8.50	23.79000	15.29
13GW120A	OU14-13GW120A-03D	11.68	25.45000	13.77
13GW135	OU14-13GW135-03D	8.29	22.23000	13.94
13GW143	OU14-13GW143-03D	7.48	22.03000	14.55
13GW144	OU14-13GW144-03D	6.60	21.78000	15.18
13GW17	OU14-13GW17-03D	8.74	24.08000	15.34
13GW19	OU14-13GW19-03D	9.45	23.48000	14.03
13GW20	OU14-13GW20-03D	9.70	23.24000	13.54
13GW29	OU14-13GW29-03D	11.38	24.86000	13.48
56GW02	OU14-56GW02-03D	11.35	23.93000	12.58
56GW06	OU14-56GW06-03D	14.58	27.15000	12.57
56GW07	OU14-56GW07-03D	10.99	23.35000	12.36
56GW09	OU14-56GW09-03D	9.78	21.52000	11.74
56GW13	OU14-56GW13-03D	11.64	23.60000	11.96
56GW23	OU14-56GW23-03D	10.52	22.33000	11.81
66GW05	OU14-66GW05-03D	9.74	22.27000	12.53
66GW06	OU14-66GW06-03D	11.01	22.44000	11.43
66GW07	OU14-66GW07-03D	10.64	22.41000	11.77
66GW10	OU14-66GW10-03D	9.15	21.88000	12.73
66GW13	OU14-66GW13-03D	10.85	22.24000	11.39
66GW14	OU14-66GW14-03D	10.68	22.11000	11.43
66GW20	OU14-66GW20-03D	13.82	26.78000	12.96
66GW28	OU14-66GW28-03D	7.48	21.10000	13.62
66GW29	OU14-66GW29-03D	11.37	25.88000	14.51
66GW33	OU14-66GW33-03D	10.68	24.08000	13.40
66GW34	OU14-66GW34-03D	10.35	24.00000	13.65
66GW37	OU14-66GW37-03D	10.92	24.15000	13.23
66GW46	OU14-66GW46-03D	12.15	22.16000	10.01
66GW47	OU14-66GW47-03D	12.32	22.09000	9.77
72GW02	OU14-72GW02-03D	8.95	26.52000	17.57
72GW04	OU14-72GW04-03D	8.90	25.72000	16.82
72GW06	OU14-72GW06-03D	11.96	27.99000	16.03
72GW07	OU14-72GW07-03D	12.15	28.30000	16.15
72GW09	OU14-72GW09-03D	10.77	26.73000	15.96
72GW10	OU14-72GW10-03D	10.57	27.06000	16.49
72GW12	OU14-72GW12-03D	10.15	25.62000	15.47
72GW14	OU14-72GW14-03D	7.83	24.72000	16.89
72GW15	OU14-72GW15-03D	9.62	26.53000	16.91
72GW18	OU14-72GW18-03D	10.05	25.79000	15.74
72GW19	OU14-72GW19-03D	10.18	25.82000	15.64
72GW20	OU14-72GW20-03D	10.96	26.93000	15.97
72GW21	OU14-72GW21-03D	10.62	26.26000	15.64
72GW24	OU14-72GW24-03D	10.85	27.03000	16.18
72GW25	OU14-72GW25-03D	9.89	26.46000	16.57
72GW26	OU14-72GW26-03D	6.66	26.60000	19.94
72GW27	OU14-72GW27-03D	9.79	26.70000	16.91
72GW28	OU14-72GW28-03D	6.53	26.00000	19.47
72GW29	OU14-72GW29-03D	9.39	26.13000	16.74
72GW38	OU14-72GW38-03D	9.05	21.34000	12.29
72GW41	OU14-72GW41-03D	8.71	21.16000	12.45
72GW43	OU14-72GW43-03D	10.24	23.59000	13.35
OU1-MW61	OU1-MW61-03D	6.25	NA	NA
OU1-MW62	OU1-MW62-03D	10.81	NA	NA

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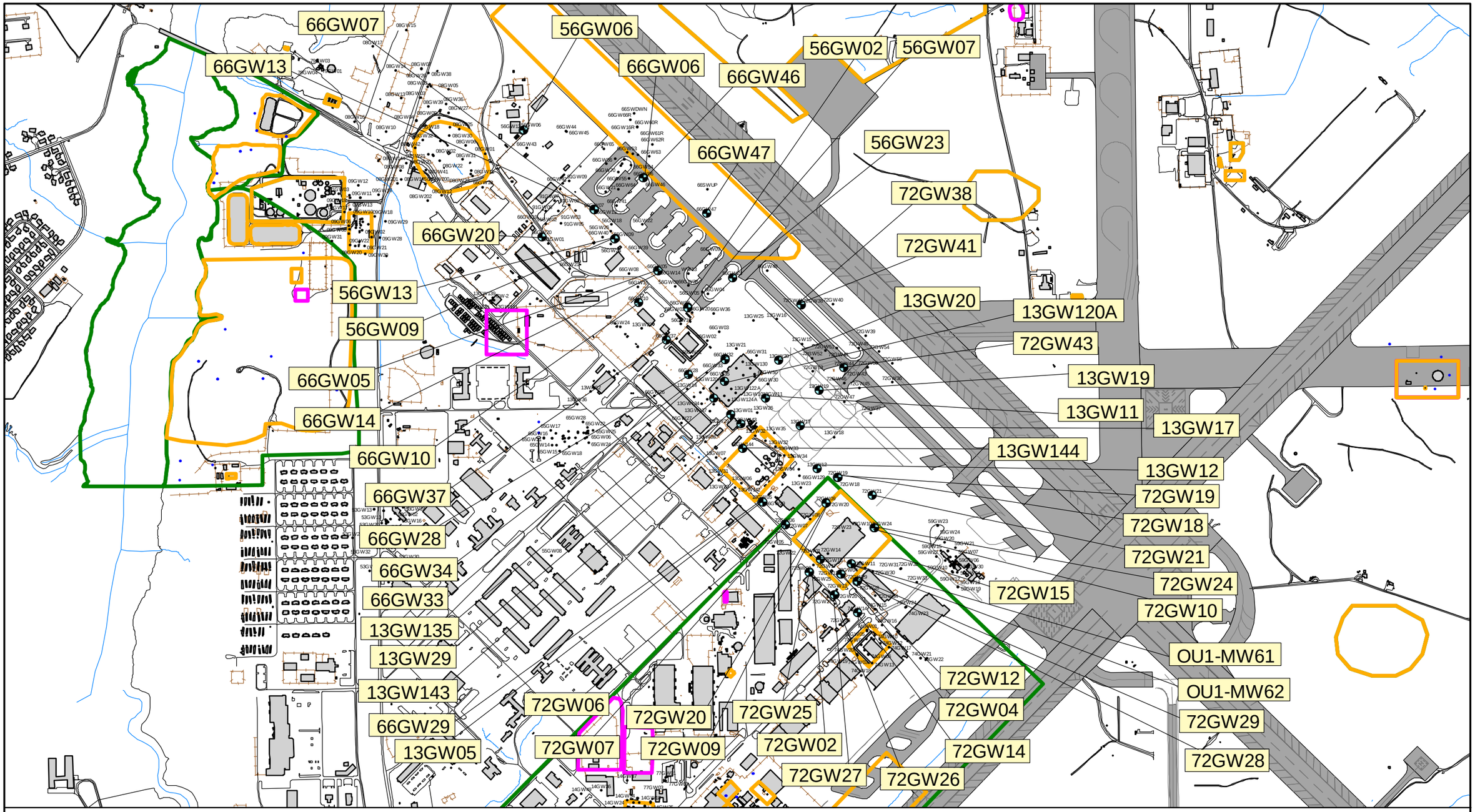


LEGEND

- Monitoring Well
- Buildings
- Roads
- Water Bodies

Note:
Monitoring wells in call out boxes were sampled as part of the Phase II investigation.

N

0 700 1400 Feet

Figure 3-1
Phase II Investigation Monitoring Well Locations
OU14, Site 90
MCAS Cherry Point

CH2MHILL

SECTION 4

Summary of Results

4.1 Field Parameters

Water quality parameters (pH, specific conductance, temperature, dissolved oxygen [DO], oxidation-reduction potential [ORP], and turbidity) were measured during the collection of groundwater samples. The measured water quality parameters are indicative of the groundwater conditions, and provide information necessary to evaluate the potential for natural reductive dechlorination. **Table 4-1** presents the water quality parameter results.

4.1.1 pH

The optimum pH range for microbial activity is between 6 and 8 units. Sitewide, in late October 2003, the pH ranged from 4.26 to 7.48, with an average of 5.82, indicating that the pH of the groundwater varies and is not within optimal range for microbial activity on average. The pH in the groundwater around Building 130 tends to be higher than average, while the pH around the aircraft parking apron tends to be lower than average.

4.1.2 Specific Conductance

Specific conductance measurements are used to indicate whether groundwater extracted from wells is representative of the same water-bearing zone at a site. Conductance readings ranged from 0.005 to 3.38 milli-Siemens per centimeter (mS/cm). The conductance of the groundwater within the upper and lower surficial aquifer was within the same range, indicating that they are hydraulically one unit.

4.1.3 Temperature

The optimum temperature range for microbial activity is 8 to 30 degrees centigrade (°C), and microbial activity doubles for every 10-degree rise in temperature within that range. During the Phase II investigation in late October 2003, groundwater temperatures varied from 20 to 32.09 °C, with an average of 23.18 °C. On average, the groundwater temperatures are within the mid-range for optimal microbial activity.

4.1.4 Dissolved Oxygen (DO)

DO is a measure of oxygen dissolved in a solution. DO concentrations greater than 0.5 milligrams per liter (mg/L) typically are indicative of sufficient oxygen in the environment to support aerobic reactions. DO concentrations greater than 2 mg/L reflect well-aerated groundwater.

DO ranged from 0.0 to 7.6 mg/L in late October 2003, with an average of 0.81 mg/L. The highest DO concentration of 7.6 mg/L was measured approximately 200 ft southeast of Building 130. Under unconfined conditions, the groundwater at the surface of the saturated zone is exposed to the ambient air, increasing the DO concentration in this zone. DO tends to

transfer into the gas phase and leaves the groundwater at increasing pressure created by increasing water depths.

4.1.5 Oxidation-Reduction Potential (ORP)

ORP (or redox) is a measure of electron activity and an indicator of the relative tendency of a solution to accept or transfer electrons. Negative or relatively low redox values can be used to identify areas under anaerobic conditions. The ORP in groundwater samples from late October 2003ranged from –252 to 304 millivolts (mV), with an average of -22.32 mV.

Sitewide, the data tend to exhibit a decrease in ORP with increasing depth, indicating an increasingly reducing environment.

4.1.6 Turbidity

Turbidity is an indicator for water quality that does not necessarily impact VOC concentrations, but often impacts inorganic concentrations. High turbidity tends to produce higher inorganic concentrations. The turbidity in groundwater samples from late October 2003 ranged from 0 to 459 Nephelometric Turbidity Units (NTU), with an average of 67.30 NTU.

There does not appear to be a correlation between high concentrations of arsenic and high turbidity.

4.2 Analytical Results

Chlorinated and non-chlorinated VOCs, including petroleum-related compounds such as BTEX, were detected in the groundwater at OU14, Site 90. The discussion in the following sections will focus on the CVOCs, as they are target contaminants in this investigation. Petroleum-related contamination will be discussed only briefly, as it is being addressed under the UST program at MCAS Cherry Point. Arsenic contamination is only briefly discussed because most detected concentrations were within the range of background concentrations (3.3 to 26.1 µg/L) found at MCAS Cherry Point.

4.2.1 Groundwater

Groundwater sample results were screened against the following regulatory criteria:

- Federal Maximum Contaminant Levels (MCLs) and secondary guidelines (SMCLs);
- North Carolina 2L Groundwater Standards (NC2L); and
- United States Environmental Protection Agency Region IX Preliminary Remediation Goals (PRGs) for tap water.

Groundwater VOC detections and exceedances are presented in **Table 4-2** and exceedances are shown numerically (box diagram) in **Figure 4-1** and graphically in **Figure 4-2**.

4.2.1.1 Upper Surficial Aquifer Groundwater

CVOCs were found to be present in the upper portion of the surficial aquifer (approximately 10 to 20 ft bgs), predominately adjacent to Building 130 and the Heavy Fuel pits northwest of "Hotel" taxiway (near MWs 56GW02 and 56GW07). To graphically show

the distribution of CVOCs at OU14, all detected and relevant CVOCs were summed per well and plotted in **Figure 4-3** using isoconcentration lines. Eleven CVOCs were detected in the UST program wells screened in the upper portion of the surficial aquifer: 1,1-dichloroethane (1,1-DCA), 1,1-dichloroethene (1,1-DCE), 1,2-DCA, cis-1,2-DCE, trans-1,2-DCE, tetrachloroethene (PCE), trichloroethene (TCE), , chloromethane, methylene chloride, and vinyl chloride. Additionally, three CVOC-type compounds were detected in the upper portion of the surficial aquifer: 1,1,2-trichloro-1,2,2-trifluoroethane (Freon-113), dichlorodifluoromethane (Freon-12), and trichlorofluoromethane (Freon-11). These compounds are thought to be laboratory contaminants and are not grouped with the traditional aforementioned CVOCs.

The highest concentrations of 1,1-DCA,and vinyl chloride in the upper portion of the surficial aquifer were found at OU1-MW61, located adjacent to the southeast wall of Building 130. This is consistent with the assumption that the Wash Rack is the source of contamination in the vicinity of Building 130, although several soil investigations were not able to conclusively confirm this. Location 56GW02, south of the Heavy Fuel pits, had the highest concentration of PCE, TCE, 1,2-DCA, and cis-1, 2-DCE found in the shallow groundwater samples. 1,1-DCE was detected below screening criteria at two locations near Building 130: 72GW04 and OU1-MW61. Trans-1,2-DCE was detected well below screening criteria in 66GW34 and OU1-MW61.

1,2-DCA exceeded one or more screening criteria at OU1-MW61 near Building 130, 13GW05 near tank farm A, and 56GW02 near the Heavy Fuel pits. PCE exceeded two screening criteria at 56GW02.

TCE exceeded one or more screening criteria at 13GW12, 56GW02, 66GW34, and 66GW47.

Vinyl chloride exceeded one or more screening criteria at OU1-MW61, 13GW12, 66GW34, 72GW04, and 72GW21. The vinyl chloride concentration at OU1-MW61 (110 micrograms per liter [µg/L]) is 1 to 2 orders of magnitude greater than other detected concentrations in both the shallow and deep samples, and exceeds all three screening criteria.

Chloromethane exceeded two screening criteria at 13GW135. The methylene chloride concentration at 66GW28 exceeded all three screening criteria.

Non-chlorinated VOCs detected in the upper surficial aquifer that exceeded screening criteria included benzene, cumene, cyclohexane, ethylbenzene, methyl-tert-butyl ether (MTBE, and total xylenes. Methylcyclohexane and toluene were detected in upper surficial aquifer groundwater, but did not exceed any screening criteria.

Arsenic was the only metal to exceed one or more screening criteria. It was detected in 16 shallow monitoring wells, with the maximum concentration (69.9 µg/L) occurring at 66GW47, which exceeds all three screening criteria. Four of the arsenic detections were greater than the maximum air station background concentration (26.1 µg/L). Sulfate slightly exceeded its screening criteria (250 mg/L) at 72GW28 with a concentration of 260 mg/L.

4.2.1.2 Summary of Upper Surficial Aquifer Groundwater Investigation Results

The CVOCs detected in the upper surficial aquifer groundwater during the Phase II investigation can be divided into two separate CVOC-impacted areas. The first previously identified plume adjacent to Building 130 contains compounds indicative of progressive and

complete degradation of TCE (1,2-DCE and vinyl chloride). The data acquired during Phase II are consistent with previous investigations, and indicate that CVOC concentrations in the upper surficial aquifer fall below screening criteria approximately 150 to 250 ft downgradient (northwest) of OU1-MW61, the well with the highest CVOC concentration in the vicinity of Building 130. The TCE degradation is likely the result of good biogeochemical conditions for reduction present in the upper surficial aquifer. The very low ORP values (-172 and -254 mV) and low DO concentrations (0 and 0.34 mg/L) at locations 13GW12 and OU1-MW61 in the center of the plume suggest an environment in which reductive dechlorination of chlorinated solvents can and is readily occurring. Several wells on the perimeter of the plume also exhibit very low ORP values and DO depletion, indicating a widespread reductive environment in the area of this plume. Field parameters are listed in **Table 4-1**.

The second CVOC-impacted area was identified southeast of the Heavy Fuel pits and west of "Hotel" taxiway (near MWs 56GW02 and 56GW07). The origins of the CVOC detections in this area are unclear, but are primarily TCE and lesser amounts of 1,2-DCA, cis-1,2-DCE and PCE. The absence of the daughter compounds beyond cis-1,2-DCE—such as vinyl chloride and ethenes—suggests that CVOCs either may not be degrading as rapidly in this area or 1,2-DCE may be converted to end products at such rapid rates that they are not accumulating and therefore are not detectable. The very low ORP values of -182 and no detectable DO concentrations at location 56GW02 suggest an environment in which reductive dechlorination of chlorinated solvents is readily occurring. The absence of daughter compounds may be because this plume is more recent. Both shallow plumes described indicate that additional investigation of the subsurface is required to help understand the physical groundwater flow and geologic conditions governing plume dynamics. The investigation should focus on defining links from sources to plumes, assessing factors governing migration of the plume (hydraulics and detailed descriptions of the lithology), and monitoring changes in geochemical conditions that would influence degradation rates.

4.2.1.3 Lower Surficial Aquifer Groundwater

Seven of the eleven CVOCs detected in the upper surficial aquifer were also detected in the wells screened in the lower surficial aquifer (36 to 50 ft bgs). The CVOCs are primarily southeast of Building 250, upgradient of Building 130, and near the Heavy Fuel pits. To graphically show the distribution of CVOCs at OU14, all relevant detected CVOCs were summed per well and plotted in **Figure 4-4** using isoconcentration lines. Chloromethane, methylene chloride, and PCE were not detected in the samples from the lower surficial aquifer, and no CVOCs were found that were not also detected in the upper portion of the aquifer.

Cis-1,2-DCE, and 1,1-DCA were the most frequently detected CVOCs in the lower surficial aquifer. Cis-1,2-DCE exceeded one or more screening criteria in three wells with the highest concentration (190 µg/L) at 13GW11. 1,1-DCA did not exceed any screening criteria. Trans-1,2-DCE was detected in one lower surficial well and did not exceed any screening criteria.

TCE was detected in nine lower surficial aquifer monitoring wells, with the highest concentration (98 µg/L) occurring at 56GW09 near the Heavy Fuel pits. TCE exceeded one

or more screening criteria at nine wells: 13GW11, 13GW143, 13GW144, 56GW09, 66GW29, 66GW46, 72GW19, 72GW27, and 72GW29.

Vinyl chloride was detected in the lower surficial aquifer at one location, upgradient from Building 130 at 72GW27, at a concentration of 2 µg/L, which equals or exceeds all three screening criteria.

1,2-DCA was detected at four locations in the lower surficial aquifer, with the highest concentration (0.5 µg/L) at OU1-MW62, which exceeds the NC2L and Region IX PRG. 1,2-DCA exceeded one or more screening criteria in 56GW09, 66GW33, and 66GW46. 1,1-DCE was detected twice in the lower surficial aquifer, with the highest concentration (0.6 µg/L) in 72GW19, which is below the screening criteria.

Non-chlorinated VOCs detected in the lower surficial aquifer that exceeded screening criteria included benzene, cumene, cyclohexane, ethylbenzene, MTBE, and total xylenes. Acetone, 2-hexanone, methylcyclohexane, and toluene were detected in lower surficial aquifer groundwater, but did not exceed any screening criteria.

No metals exceeded the screening criteria in the lower surficial aquifer samples. Sulfate exceeded one or more screening criteria in two deep wells with concentrations at 2,000 mg/L) in OU1-MW62 and 1000 mg/L in 72GW12. Both exceed NC2Ls and SMCLs for groundwater. These values are more than an order of magnitude higher than the average concentrations measured at OU14, Site 90. It is unclear why these values are elevated in the lower surficial aquifer southeast of Building 130.

4.2.1.4 Summary of Lower Surficial Aquifer Groundwater Investigation Results

The distribution and concentrations of CVOCs in the lower surficial aquifer correlate well with the upper surficial aquifer concentrations. The CVOC plume around the shallow aquifer well OU1-MW61 near Building 130 appears to have migrated downward and laterally. The highest concentrations in the lower surficial are downgradient of the peak concentrations of upper surficial aquifer (between wells 13GW11 and 72GW19, southeast of Building 250). With a more permeable formation and higher groundwater velocity in the lower portion of the aquifer, the plume in this area is expected to migrate more rapidly, accounting for the more continuous and large lower surficial aquifer plume.

Low concentrations of TCE were detected (3 µg/L at 13GW11); however, its daughter product cis-1,2-DCE was detected at 190 µg/L at the same location. The absence of the daughter compounds beyond cis-1,2-DCE—such as vinyl chloride and ethenes—suggests that CVOCs either may not be degrading at as rapidly in this area or 1,2-DCE may be converted to end products at such rapid rates that they are not accumulating and therefore are not detectable. The TCE degradation is likely the result of fair biogeochemical conditions for reduction present in the upper surficial aquifer. The low ORP values (between +59 and -78 mV) and no detections of DO across the plume suggest an environment in which reductive dechlorination of chlorinated solvents can and is occurring. Field parameters are listed in **Table 4-1**.

It is not clear how the elevated CVOC concentrations migrated to the upgradient location 72GW27, southeast and across Sixth Avenue from Building 130. Another source upgradient of the vicinity, e.g., from OU1, may have contributed to this CVOC-impacted area. The

reducing conditions at this location (-11 mV and no DO) and detection of TCE as well as its daughter products cis-1,2-DCE and VC suggest reductive dechlorination of CVOCs is occurring in this location.

The CVOC concentrations at 56GW09 near the Heavy Fuel pits are anomalous. The area at one time may have been part of the larger plume in the upper portion of the aquifer, with reductive dechlorination having reduced the concentrations at a faster rate in the area between the remaining plumes. Higher TCE concentrations, the presence of 1,1-DCE, and the lack of 1,1-DCA differentiate this plume chemically from the larger plume to the southeast; thus, it is more likely a result of a separate former source (although no CVOCs have been detected in the upper surficial aquifer). The ORP is 39 mV at both 56GW09 and the downgradient location about 650 ft to the northeast (66GW46) and DO was not detected. These values suggest a moderate reducing environment in which biodegradation of TCE will occur. The daughter product cis-1,2-DCE detected in 56GW09 and downgradient in 66GW46 support this conclusion.

Table 4-1
Field Parameters for Groundwater Sampling Locations
OU14 Site 90
MCAS Cherry Point

Table 2
Field Parameters for Groundwater Sampling Locations

Station ID	OU1-MW61	OU1-MW62	OU14-13GW05	OU14-13GW11	OU14-13GW12	OU14-13GW120A	OU14-13GW135	OU14-13GW143	OU14-13GW144	OU14-13GW17	OU14-13GW19	OU14-13GW20	OU14-13GW29	OU14-56GW02
Sample ID	OU1-MW61-03D	OU1-MW62-03D	OU14-13GW05-03D	OU14-13GW11-03D	OU14-13GW12-03D	OU14-13GW120A-03D	OU14-13GW135-03D	OU14-13GW143-03D	OU14-13GW144-03D	OU14-13GW17-03D	OU14-13GW19-03D	OU14-13GW20-03D	OU14-13GW29-03D	OU14-56GW02-03D
Sample Date	10/22/2003	10/22/2003	10/23/2003	10/28/2003	10/30/2003	10/28/2003	10/24/2003	10/28/2003	10/29/2003	10/28/2003	10/28/2003	10/28/2003	10/24/2003	10/29/2003
Field Parameters														
Dissolved Oxygen (MG/L)	0.34	0	0.27	0	0	0	0.38	0	0	0	0.31	0	0	0
Oxidation Reduction Potential (mV)	-49	-170	-26	59	-172	64	-147	-9	-12	3	-100	-10	-2	-182
pH (pH)	5.73	6.51	5.51	5.37	4.72	4.47	4.84	5.25	5.2	5.03	4.92	5.88	5.48	4.26
Salinity (%)	0.01	0.17	0.01	0.01	0	0.02	0	0	0	0.01	0.01	0.01	0	0
Specific Conductance (ms/cm)	0.254	3.38	0.35	0.146	0.02	0.41	0.1	0.13	0.108	0.176	0.17	0.33	0.118	0.01
Temperature (C)	25.4	22.59	21.8	23	24.64	22.39	24.4	20.7	20.66	24.67	23.5	24.9	20.97	20.5
Turbidity (NTU)	0	280	3.5	126	60	43.7	40	60	172	61.7	30	42	138	0

Station ID	OU14-56GW06	OU14-56GW07	OU14-56GW09	OU14-56GW12	OU14-56GW13	OU14-56GW23	OU14-66GW05	OU14-66GW06	OU14-66GW07	OU14-66GW10	OU14-66GW13	OU14-66GW14	OU14-66GW20	OU14-66GW28
Sample ID	OU14-56GW06-03D	OU14-56GW07-03D	OU14-56GW09-03D	OU14-56GW12-03D	OU14-56GW13-03D	OU14-56GW23-03D	OU14-66GW05-03D	OU14-66GW06-03D	OU14-66GW07-03D	OU14-66GW10-03D	OU14-66GW13-03D	OU14-66GW14-03D	OU14-66GW20-03D	OU14-66GW28-03D
Sample Date	10/27/2003	10/29/2003	10/24/2003	10/27/2003	10/24/2003	10/28/2003	10/30/2003	10/30/2003	10/30/2003	10/29/2003	10/30/2003	10/30/2003	10/24/2003	10/29/2003
Field Parameters														
Dissolved Oxygen (MG/L)	2.39	0	0	0.47	0.24	0.29	0	0	3.94	0.08	NA	5	4.88	0
Oxidation Reduction Potential (mV)	304	-137	39	76	-158	187	-131	-252	-3	-1	40	18	251	-87
pH (pH)	4.81	5.9	5.25	5.72	6.26	4.96	6.49	6.52	6.56	6.62	6.06	5.86	4.77	5.61
Salinity (%)	0	0.01	0.01	0.01	0.01	0.01	0	0	0	0.01	0.01	0	0	0.01
Specific Conductance (ms/cm)	0.126	0.244	0.15	0.22	0.32	0.18	0.023	0.05	0.012	0.31	0.33	NA	0.091	0.137
Temperature (C)	22.46	22.04	20	20.3	22.2	23	21.88	21.8	21.49	22.5	20.3	20.04	21.85	25.13
Turbidity (NTU)	103.3	112	48	10	95	60	92.7	50	54.3	49	0	39.1	31.2	274

Station ID	OU14-66GW29	OU14-66GW33	OU14-66GW34	OU14-66GW37	OU14-66GW46	OU14-66GW47	OU14-72GW02	OU14-72GW04	OU14-72GW06	OU14-72GW07	OU14-72GW09	OU14-72GW10	OU14-72GW12	OU14-72GW14
Sample ID	OU14-66GW29-03D	OU14-66GW33-03D	OU14-66GW34-03D	OU14-66GW37-03D	OU14-66GW46-03D	OU14-66GW47-03D	OU14-72GW02-03D	OU14-72GW04-03D	OU14-72GW06-03D	OU14-72GW07-03D	OU14-72GW09-03D	OU14-72GW10-03D	OU14-72GW12-03D	OU14-72GW14-03D
Sample Date	10/23/2003	10/29/2003	10/29/2003	10/29/2003	10/30/2003	10/28/2003	10/23/2003	10/22/2003	10/23/2003	10/23/2003	10/24/2003	10/23/2003	10/22/2003	10/23/2003
Field Parameters														
Dissolved Oxygen (MG/L)	0	0	0	0	NA	0	0	0.7	3.13	0.3	4.84	0.16	0	0
Oxidation Reduction Potential (mV)	-99	-39	-20	141	39	-59	-48	-102	271	-139	157	-39	-156	105
pH (pH)	6.61	5.31	5.16	4.42	5.57	5.98	5.83	6.09	4.78	6.79	6.47	6.06	6.6	6.12
Salinity (%)	0.03	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.03	0.02	0.01	0.11	0.02
Specific Conductance (ms/cm)	0.634	0.273	0.329	0.21	0.262	0.36	0.344	0.32	0.204	0.67	0.46	0.22	2.19	0.44
Temperature (C)	21.37	21.6	23.74	23.7	21.12	22.78	24.35	32.09	26.45	23.7	25	25.8	30.5	23.38
Turbidity (NTU)	126	459	123	41	0	36.8	14.4	3.2	9.8	41	17	24	200	25.6

Station ID	OU14-72GW15	OU14-72GW18	OU14-72GW19	OU14-72GW20	OU14-72GW21	OU14-72GW24	OU14-72GW25	OU14-72GW26	OU14-72GW27	OU14-72GW28	OU14-72GW29	OU14-72GW38	OU14-72GW41	OU14-72GW43
Sample ID	OU14-72GW15-03D	OU14-72GW18-03D	OU14-72GW19-03D	OU14-72GW20-03D	OU14-72GW21-03D	OU14-72GW24-03D	OU14-72GW25-03D	OU14-72GW26-03D	OU14-72GW27-03D	OU14-72GW28-03D	OU14-72GW29-03D	OU14-72GW38-03D	OU14-72GW41-03D	OU14-72GW43-03D
Sample Date	10/22/2003	10/31/2003	10/31/2003	10/24/2003	10/30/2003	10/23/2003	10/23/2003	10/23/2003	10/23/2003	10/22/2003	10/22/2003	10/27/2003	10/27/2003	10/27/2003
Field Parameters														
Dissolved Oxygen (MG/L)	0	0	0	1.62	0	1.32	0.27	0.29	0	7.6	0	4.71	0	0
Oxidation Reduction Potential (mV)	-70	-211	-78	69	-201	-117	-154	-33	-11	115	-92	206	-55	-23
pH (pH)	5.94	6.72	6.74	7.48	5.15	7.26	7.03	5.83	6.31	6.71	6.9	5.73	6.21	5.52
Salinity (%)	0.01	0	0.03	0.01	0	0.01	0.02	0.01	0.02	0.04	0.01	0.01	0.01	0.01
Specific Conductance (ms/cm)	0.169	0.005	0.61	0.186	0.01	0.329	0.52	0.26	0.465	0.93	0.338	0.17	0.354	0.182
Temperature (C)	29.75	23.4	22.5	22.35	24.88	22.62	21.1	24	22.13	24.7	23.6	22.6	21.75	21.95
Turbidity (NTU)	70.1	0	12	15.5	121	19.1	10	14	84.1	0	7.08	0	86.5	133

Note:
NA - Parameter not available

Table 4-2
Groundwater Detects and Exceedances
Phase II Remedial Investigation
OU14, Site 90
MCAS Cherry Point

Station ID	MCL-Groundwater (1)	NC-GW-2L (2)	Secondary MCLs (3)	Region IX PRGs - Tap Water (4)	OU1-MW61	OU1-MW62	OU14-13GW05	OU14-13GW11	OU14-13GW12	OU14-13GW120A	OU14-13GW135	OU14-13GW143	OU14-13GW144	OU14-13GW17	OU14-13GW19	OU14-13GW20
Sample ID					OU1-MW61-03D	OU1-MW62-03D	OU14-13GW05-03D	OU14-13GW11-03D	OU14-13GW12-03D	OU14-13GW120A-03D	OU14-13GW135-03D	OU14-13GW143-03D	OU14-13GW144-03D	OU14-13GW17-03D	OU14-13GW19-03D	OU14-13GW20-03D
Sample Date					10/22/03	10/22/03	10/23/03	10/28/03	10/30/03	10/28/03	10/24/03	10/28/03	10/29/03	10/28/03	10/28/03	10/28/03
Chemical Name																
Volatile Organic Compounds (UG/L)																
1,1-Dichloroethane	--	700	--	810	**170**	**5 J**	5 U	**29**	**8**	5 U	10 U	**17**	**1 J**	**1 J**	5 U	5 U
1,1-Dichloroethene	7	7	--	340	**0.3 J**	5 U	5 U	10 U	5 U	5 U	10 U	5 U	5 U	5 U	5 U	5 U
1,2-Dichloroethane	5	**0.38**	--	**0.12**	**1 J (2,4)**	**0.5 J (2,4)**	5 U	10 U	5 U	5 U	**1 J (2,4)**	5 U	5 U	5 U	5 U	5 U
Chloromethane	--	**2.6**	--	**1.5**	5 U	5 U	5 U	10 U	5 U	5 U	**3 J (2,4)**	5 U	5 U	5 U	5 U	5 U
Methylene chloride	**5**	**5**	--	**4.3**	5 U	5 U	5 U	10 U	5 U	5 U	10 U	5 U	5 U	5 U	5 U	5 U
Tetrachloroethene	5	**0.7**	--	**0.66**	5 U	5 U	5 U	10 U	5 U	5 U	10 U	5 U	5 U	5 U	5 U	5 U
Trichloroethene	**5**	**2.8**	--	**0.028**	5 U	5 U	5 U	**3 J (2,4)**	**5 (2,4)**	5 U	10 U	**8 (1,2,4)**	**6 (1,2,4)**	5 U	5 U	5 U
Vinyl chloride	**2**	**0.015**	--	**0.02**	**110 (1,2,4)**	5 U	5 U	10 U	**0.4 J (2,4)**	5 U	10 U	5 U	5 U	5 U	5 U	5 U
cis-1,2-Dichloroethene	**70**	**70**	--	**61**	**3 J**	**0.9 J**	**1 J**	**190 (1,2,4)**	**6**	5 U	**3 J**	**55**	**10**	**8**	5 U	5 U
trans-1,2-Dichloroethene	100	70	--	120	**1 J**	5 U	5 U	10 U	5 U	5 U	10 U	5 U	5 U	5 U	5 U	5 U
1,2-Dichloroethene (total)	**70**	**70**	--	--	**4 J**	10 U	10 U	**190 (1,2)**	**6 J**	10 U	**3 J**	**55**	**10**	**8 J**	10 U	10 U
Total Metals (UG/L)																
Arsenic	**10**	**50**	--	**0.045**	**8.2 (4)**	4.26 U	**3.9 J (4)**	2.13 U	2.13 U	**4.9 J (4)**	**6 J (4)**	2.13 U	2.13 U	2.13 U	**2.5 J (4)**	2.13 U
Barium	2,000	2,000	--	2,600	**82.6**	**124**	**44.2**	**78**	**57.8**	**34.3**	**71**	**80.4**	**37.7**	**65.7**	**73.3**	**22**
Cadmium	5	5	--	18	**3 J**	**4 J**	0.25 U	**4.6 J**	**0.26 J**	0.25 U	**0.35 J**	0.25 U	0.25 U	0.25 U	**0.43 J**	0.25 U
Chromium	100	50	--	--	**1.4 J**	**1.9 J**	**1 J**	**1.3 J**	0.88 U	**1.8 J**	**2.6 J**	**1.2 J**	0.88 U	0.88 U	**1.4 J**	0.88 U
Lead	15	15	--	--	1.56 U	3.12 U	1.56 U	**12.9**	1.56 U	1.56 U	**4.3 J**	1.56 U	1.56 U	1.56 U	1.56 U	1.56 U
Mercury	2	1.1	--	--	0.04 U	0.04 U	0.04 U	**0.06 J**	0.04 U	**0.05 J**	0.04 UJ	**0.04 J**	0.04 UJ	0.04 UJ	0.04 UJ	**0.04 J**
Selenium	50	50	--	180	**3.4 J**	4.64 U	2.32 U	2.32 UJ	2.32 U	2.32 UJ	2.32 U	**2.5 J**	2.32 UJ	2.32 UJ	2.32 UJ	2.32 UJ
Silver	--	18	100	180	1.16 U	**1.6 J**	1.16 U	1.16 U	1.16 U	1.16 U	1.16 U	1.16 U	1.16 U	1.16 U	1.16 U	1.16 U
Wet Chemistry (MG/L)																
Nitrate	10	10	--	10	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	**0.085**	0.05 U	**0.076**	0.05 U	**0.11**
Sulfate	--	**250**	**250**	--	**11**	**2,000 (2,3)**	**14**	**20**	**86**	**210**	**6.5**	**15**	**1.6**	**59**	**57**	**83**

1. Sample ID scheme example:
   OU14 - Operable Unit 14
   13 - UST Program Site Designation
   GW02- groundwater sample, location 02
   03D - sample collected 2003, 3rd quarter
2. Detections of a chemical are indicated by bold font.
3. Detections that exceed one or more screening criteria are indicated by bold red font.
4. Screening criteria exceeded at least once are also indicated by bold red font.
5. Data entries consist of the concentration followed by the data qualifier (if any) followed by the reference number(s).
6. J - analyte present, reported value is estimated
7. R - unreliable result
8. U - Not Detected
9. "--" - no screening criteria established
10. * - Duplicate sample collected at this location

Table 4-2
Groundwater Detects and Exceedances
Phase II Remedial Investigation
OU14, Site 90
MCAS Cherry Point

Station ID	MCL-Groundwater (1)	NC-GW-2L (2)	Secondary MCLs (3)	Region IX PRGs - Tap Water (4)	OU14-13GW29	OU14-56GW02	OU14-56GW06	OU14-56GW07
Sample ID					OU14-13GW29-03D	OU14-56GW02-03D	OU14-56GW06-03D	OU14-56GW07-03D
Sample Date					10/24/03	10/29/03	10/27/03	10/29/03
Chemical Name								
Volatile Organic Compounds (UG/L)								
1,1-Dichloroethane	--	700	--	810	100 U	**3 J**	5 U	5 U
1,1-Dichloroethene	7	7	--	340	100 U	5 U	5 U	5 U
1,2-Dichloroethane	5	**0.38**	--	**0.12**	100 U	**7 (1,2,4)**	5 U	5 U
Chloromethane	--	**2.6**	--	**1.5**	100 U	5 U	5 U	5 U
Methylene chloride	**5**	**5**	--	**4.3**	100 U	5 U	5 U	5 U
Tetrachloroethene	5	**0.7**	--	**0.66**	100 U	**1 J (2,4)**	**0.5 J**	5 U
Trichloroethene	**5**	**2.8**	--	**0.028**	100 U	**150 (1,2,4)**	5 U	5 U
Vinyl chloride	**2**	**0.015**	--	**0.02**	100 U	5 U	5 U	5 U
cis-1,2-Dichloroethene	**70**	**70**	--	**61**	**65 J (4)**	**24**	5 U	5 U
trans-1,2-Dichloroethene	100	70	--	120	100 U	5 U	5 U	5 U
1,2-Dichloroethene (total)	**70**	**70**	--	--	**65 J**	**24**	10 U	10 U
Total Metals (UG/L)								
Arsenic	**10**	**50**	--	**0.045**	2.13 U	2.13 U	2.13 U	2.13 U
Barium	2,000	2,000	--	2,600	**38.3**	**49.8**	**49.9**	**17.8**
Cadmium	5	5	--	18	0.25 U	0.25 U	0.25 U	0.25 U
Chromium	100	50	--	--	0.88 U	**2.5 J**	0.88 U	**3.4 J**
Lead	15	15	--	--	1.56 U	1.56 U	1.56 U	1.56 U
Mercury	2	1.1	--	--	0.04 UJ	**0.07 J**	**0.04 J**	0.04 UJ
Selenium	50	50	--	180	2.32 U	**3 J**	2.32 U	2.32 UJ
Silver	--	18	100	180	1.16 U	1.16 U	1.16 U	1.16 U
Wet Chemistry (MG/L)								
Nitrate	10	10	--	10	0.05 U	0.05 U	**0.2**	0.05 U
Sulfate	--	**250**	**250**	--	1 U	**45**	**42**	2 U

1. Sample ID scheme example:
   OU14 - Operable Unit 14
   13 - UST Program Site Designation
   GW02- groundwater sample, location 02
   03D - sample collected 2003, 3rd quarter
2. Detections of a chemical are indicated by bold font.
3. Detections that exceed one or more screening criteria are indicated by bold red font.
4. Screening criteria exceeded at least once are also indicated by bold red font.
5. Data entries consist of the concentration followed by the data qualifier (if any) followed by the reference number(s).
6. J - analyte present, reported value is estimated
7. R - unreliable result
8. U - Not Detected
9. "--" - no screening criteria established
10. * - Duplicate sample collected at this location

Table 4-2
Groundwater Detects and Exceedances
Phase II Remedial Investigation
OU14, Site 90
MCAS Cherry Point

Station ID	MCL-Groundwater (1)	NC-GW-2L (2)	Secondary MCLs (3)	Region IX PRGs - Tap Water (4)	OU14-56GW09*	OU14-56GW12	OU14-56GW13	OU14-56GW23	OU14-66GW05	OU14-66GW06	OU14-66GW07*	OU14-66GW10*	OU14-66GW13*
Sample ID					OU14-56GW09-03D	OU14-56GW12-03D	OU14-56GW13-03D	OU14-56GW23-03D	OU14-66GW05-03D	OU14-66GW06-03D	OU14-66GW07-03D	OU14-66GW10-03D	OU14-66GW13-03D
Sample Date					10/24/03	10/27/03	10/24/03	10/28/03	10/30/03	10/30/03	10/30/03	10/29/03	10/30/03
Chemical Name													
Volatile Organic Compounds (UG/L)													
1,1-Dichloroethane	--	700	--	810	5 U	5 U	25 U	**0.6 J**	5 U	5 U	5 U	5 U	5 U
1,1-Dichloroethene	7	7	--	340	5 U	5 U	25 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dichloroethane	5	**0.38**	--	**0.12**	**0.4 J (2,4)**	5 U	25 U	5 U	5 U	5 U	5 U	5 U	5 U
Chloromethane	--	**2.6**	--	**1.5**	5 U	5 U	25 U	5 U	5 U	5 U	5 U	5 U	5 U
Methylene chloride	**5**	**5**	--	**4.3**	5 U	5 U	25 U	5 U	5 U	5 U	5 U	5 U	5 U
Tetrachloroethene	5	**0.7**	--	**0.66**	5 U	5 U	25 U	5 U	5 U	5 U	5 U	5 U	5 U
Trichloroethene	**5**	**2.8**	--	**0.028**	**98 (1,2,4)**	5 U	25 U	5 U	5 U	5 U	5 U	5 U	5 U
Vinyl chloride	**2**	**0.015**	--	**0.02**	5 U	5 U	25 U	5 U	5 U	5 U	5 U	5 U	5 U
cis-1,2-Dichloroethene	**70**	**70**	--	**61**	**11**	5 U	25 U	5 U	5 U	5 U	5 U	5 U	5 U
trans-1,2-Dichloroethene	100	70	--	120	5 U	5 U	25 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dichloroethene (total)	**70**	**70**	--	--	**11**	10 U	50 U	10 U	10 U	10 U	10 U	10 U	10 U
Total Metals (UG/L)													
Arsenic	**10**	**50**	--	**0.045**	**6.6 J (4)**	2.13 U	**39.3 (1,4)**	2.13 U	**2.8 J (4)**	**42.4 (1,4)**	2.13 U	2.13 U	2.13 U
Barium	2,000	2,000	--	2,600	**67.9**	**59.5**	**11.6**	**56.8**	**24.8**	**21.5**	**10.2**	**13.8**	**84**
Cadmium	5	5	--	18	0.25 U	0.25 U	**0.84 J**	0.25 U	**0.43 J**	0.25 U	0.25 U	0.25 U	**0.27 J**
Chromium	100	50	--	--	**1.7 J**	0.88 U	0.88 U	0.88 U	**1.9 J**	**0.93 J**	**1 J**	0.88 U	**1.1 J**
Lead	15	15	--	--	1.56 U	1.56 U	**3.5 J**	1.56 U	**14.6**	**2.2 J**	**2.1 J**	1.56 U	1.56 U
Mercury	2	1.1	--	--	**0.05 J**	0.04 UJ	0.04 UJ	0.04 UJ	0.04 U	0.04 U	**0.05 J**	**0.07 J**	0.04 U
Selenium	50	50	--	180	**3.9 J**	**3 J**	2.32 U	2.32 UJ	2.32 U	2.32 U	**3.4 J**	2.32 UJ	2.32 U
Silver	--	18	100	180	1.16 U	1.16 U	1.16 U	1.16 U	1.16 U	1.16 U	1.16 U	1.16 U	1.16 U
Wet Chemistry (MG/L)													
Nitrate	10	10	--	10	0.05 U	0.05 U	0.05 U	**0.26**	**0.16**	0.05 U	**0.73**	0.05 U	**0.59**
Sulfate	--	**250**	**250**	--	**34**	**25**	1 U	**68**	**16**	1 U	**7.7**	**7.6**	**19**

1. Sample ID scheme example:
   OU14 - Operable Unit 14
   13 - UST Program Site Designation
   GW02- groundwater sample, location 02
   03D - sample collected 2003, 3rd quarter
2. Detections of a chemical are indicated by bold font.
3. Detections that exceed one or more screening criteria are indicated by bold red font.
4. Screening criteria exceeded at least once are also indicated by bold red font.
5. Data entries consist of the concentration followed by the data qualifier (if any) followed by the reference number(s).
6. J - analyte present, reported value is estimated
7. R - unreliable result
8. U - Not Detected
9. "--" - no screening criteria established
10. * - Duplicate sample collected at this location

Table 4-2
Groundwater Detects and Exceedances
Phase II Remedial Investigation
OU14, Site 90
MCAS Cherry Point

Station ID Sample ID Sample Date	MCL-Groundwater (1)	NC-GW-2L (2)	Secondary MCLs (3)	Region IX PRGs - Tap Water (4)	OU14-66GW14 OU14-66GW14-03D 10/30/03	OU14-66GW20 OU14-66GW20-03D 10/24/03	OU14-66GW28 OU14-66GW28-03D 10/29/03	OU14-66GW29 OU14-66GW29-03D 10/23/03	OU14-66GW33 OU14-66GW33-03D 10/29/03	OU14-66GW34 OU14-66GW34-03D 10/29/03	OU14-66GW37* OU14-66GW37-03D 10/29/03	OU14-66GW46 OU14-66GW46-03D 10/30/03	OU14-66GW47 OU14-66GW47-03D 10/28/03
Chemical Name													
Volatile Organic Compounds (UG/L)													
1,1-Dichloroethane	--	700	--	810	5 U	5 U	25 U	**4 J**	**0.4 J**	5 U	5 U	5 U	5 U
1,1-Dichloroethene	7	7	--	340	5 U	5 U	25 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dichloroethane	5	**0.38**	--	**0.12**	5 U	5 U	25 U	5 U	**0.5 J (2,4)**	5 U	5 U	**0.3 J (4)**	5 U
Chloromethane	--	**2.6**	--	**1.5**	5 U	5 U	25 U	5 U	5 U	5 U	5 U	5 U	5 U
Methylene chloride	**5**	**5**	--	**4.3**	5 U	5 U	**7 J (1,2,4)**	5 U	5 U	5 U	5 U	5 U	5 U
Tetrachloroethene	5	**0.7**	--	**0.66**	5 U	5 U	25 U	5 U	5 U	5 U	5 U	5 U	5 U
Trichloroethene	**5**	**2.8**	--	**0.028**	5 U	5 U	25 U	**5 (2,4)**	5 U	**4 J (2,4)**	5 U	**1 J (4)**	**8 (1,2,4)**
Vinyl chloride	**2**	**0.015**	--	**0.02**	5 U	5 U	25 U	5 U	5 U	**0.6 J (2,4)**	5 U	5 U	5 U
cis-1,2-Dichloroethene	**70**	**70**	--	**61**	5 U	5 U	**3 J**	**6**	**9**	**3 J**	5 U	**3 J**	5 U
trans-1,2-Dichloroethene	100	70	--	120	5 U	5 U	25 U	5 U	5 U	**2 J**	5 U	5 U	5 U
1,2-Dichloroethene (total)	**70**	**70**	--	--	10 U	10 U	50 U	**6 J**	**9 J**	**5 J**	10 U	**3 J**	**2 J**
Total Metals (UG/L)													
Arsenic	**10**	**50**	--	**0.045**	2.13 U	**2.3 J (4)**	2.13 U	2.13 U	2.13 U	2.13 U	2.13 U	2.13 U	**69.9 (1,2,4)**
Barium	2,000	2,000	--	2,600	**18.3**	**42.5**	**23.3**	**58.4**	**140**	**56**	**79.3**	**72.4**	**35.6**
Cadmium	5	5	--	18	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Chromium	100	50	--	--	**1.7 J**	0.88 U	**3.5 J**	**0.92 J**	**5.1 J**	**2.6 J**	**1.3 J**	**1.8 J**	**1.5 J**
Lead	15	15	--	--	1.56 U	1.56 U	**2.4 J**	1.56 U	1.56 U	**7.3**	**5**	1.56 U	1.56 U
Mercury	2	1.1	--	--	0.04 U	**0.05 J**	0.04 UJ	**0.06 J**	**0.05 J**	**0.04 J**	**0.06 J**	0.04 U	**0.04 J**
Selenium	50	50	--	180	**4 J**	2.32 U	2.32 UJ	2.32 U	**3.2 J**	**5.1 J**	**2.8 J**	2.32 U	2.32 UJ
Silver	--	18	100	180	1.16 U	1.16 U	1.16 U	1.16 U	1.16 U	1.16 U	1.16 U	1.16 U	1.16 U
Wet Chemistry (MG/L)													
Nitrate	10	10	--	10	**0.1**	**1.3**	**0.26**	0.05 U	0.05 U	**0.57**	**3.2**	0.05 U	**0.059**
Sulfate	--	**250**	**250**	--	**35**	**25**	**38**	**32**	**96**	**130**	**83**	**79**	**92**

1. Sample ID scheme example:
   OU14 - Operable Unit 14
   13 - UST Program Site Designation
   GW02- groundwater sample, location 02
   03D - sample collected 2003, 3rd quarter
2. Detections of a chemical are indicated by bold font.
3. Detections that exceed one or more screening criteria are indicated by bold red font.
4. Screening criteria exceeded at least once are also indicated by bold red font.
5. Data entries consist of the concentration followed by the data qualifier (if any) followed by the reference number(s).
6. J - analyte present, reported value is estimated
7. R - unreliable result
8. U - Not Detected
9. "--" - no screening criteria established
10. * - Duplicate sample collected at this location

Table 4-2
Groundwater Detects and Exceedances
Phase II Remedial Investigation
OU14, Site 90
MCAS Cherry Point

Station ID	**MCL-Groundwater (1)**	**NC-GW-2L (2)**	**Secondary MCLs (3)**	**Region IX PRGs - Tap Water (4)**	OU14-72GW02	OU14-72GW04	OU14-72GW06	OU14-72GW07*	OU14-72GW09	OU14-72GW10	OU14-72GW12	OU14-72GW14	OU14-72GW15*	OU14-72GW18
Sample ID					OU14-72GW02-03D	OU14-72GW04-03D	OU14-72GW06-03D	OU14-72GW07-03D	OU14-72GW09-03D	OU14-72GW10-03D	OU14-72GW12-03D	OU14-72GW14-03D	OU14-72GW15-03D	OU14-72GW18-03D
Sample Date					10/23/03	10/22/03	10/23/03	10/23/03	10/24/03	10/23/03	10/22/03	10/23/03	10/22/03	10/31/03
Chemical Name														
Volatile Organic Compounds (UG/L)														
1,1-Dichloroethane	--	700	--	810	5 U	**14**	5 U	**0.4 J**	5 U	**0.4 J**	**2 J**	5 U	5 U	5 U
1,1-Dichloroethene	7	7	--	340	5 U	**0.4 J**	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dichloroethane	5	**0.38**	--	**0.12**	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chloromethane	--	**2.6**	--	**1.5**	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Methylene chloride	**5**	**5**	--	**4.3**	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Tetrachloroethene	5	**0.7**	--	**0.66**	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Trichloroethene	**5**	**2.8**	--	**0.028**	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Vinyl chloride	**2**	**0.015**	--	**0.02**	5 U	**28 (1,2,4)**	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
cis-1,2-Dichloroethene	**70**	**70**	--	**61**	5 U	**2 J**	5 U	5 U	5 U	**5 J**	**1 J**	5 U	**0.6 J**	5 U
trans-1,2-Dichloroethene	100	70	--	120	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dichloroethene (total)	**70**	**70**	--	--	10 U	**2 J**	10 U	10 U	10 U	**5 J**	10 U	10 U	10 U	10 U
Total Metals (UG/L)														
Arsenic	**10**	**50**	--	**0.045**	2.13 U	**40 (1,4)**	2.13 U	2.13 U	2.13 U	**22.4 (1,4)**	2.13 U	2.13 U	**3.4 J (4)**	**5.1 J (4)**
Barium	2,000	2,000	--	2,600	**100**	**64.8**	**87.1**	**53**	**42.6**	**64.5**	**133**	**61.4**	**30.1**	**12.9**
Cadmium	5	5	--	18	0.25 U	**0.28 J**	0.25 U	0.25 U	0.25 U	0.25 U	**2 J**	0.25 U	0.25 U	**0.39 J**
Chromium	100	50	--	--	0.88 U	**1 J**	0.88 U	0.88 U	0.88 U	0.88 U	**2.8 J**	0.88 U	**1.5 J**	0.88 U
Lead	15	15	--	--	1.56 U	1.56 U	1.8 U	1.56 U	1.56 U	1.56 U	**6.2**	1.56 U	1.56 U	1.56 U
Mercury	2	1.1	--	--	0.04 U	0.04 U	0.04 U	0.04 U	0.04 UJ	0.04 U	0.04 U	**0.04 J**	0.04 U	**0.05 J**
Selenium	50	50	--	180	2.32 U	2.32 U	2.32 U	2.32 U	2.32 U	2.32 U	**3.7 J**	**3.1 J**	2.32 U	**2.8 J**
Silver	--	18	100	180	1.16 U	1.16 U	1.16 U	1.16 U	1.16 U	1.16 U	1.16 U	1.16 U	1.16 U	1.16 U
Wet Chemistry (MG/L)														
Nitrate	10	10	--	10	0.05 U	0.05 U	**1.6 J**	0.05 U	**0.86**	0.05 U	0.05 U	**0.42 J**	0.05 U	**0.1**
Sulfate	--	**250**	**250**	--	**62 J**	**6.9**	**58**	1 U	**36**	**27**	**1,000 (2,4)**	**57**	**11**	**120**

1. Sample ID scheme example:
   OU14 - Operable Unit 14
   13 - UST Program Site Designation
   GW02- groundwater sample, location 02
   03D - sample collected 2003, 3rd quarter
2. Detections of a chemical are indicated by bold font.
3. Detections that exceed one or more screening criteria are indicated by bold red font.
4. Screening criteria exceeded at least once are also indicated by bold red font.
5. Data entries consist of the concentration followed by the data qualifier (if any) followed by the reference number(s).
6. J - analyte present, reported value is estimated
7. R - unreliable result
8. U - Not Detected
9. "--" - no screening criteria established
10. * - Duplicate sample collected at this location

Table 4-2
Groundwater Detects and Exceedances
Phase II Remedial Investigation
OU14, Site 90
MCAS Cherry Point

Station ID	MCL-Groundwater (1)	NC-GW-2L (2)	Secondary MCLs (3)	Region IX PRGs - Tap Water (4)	OU14-72GW19	OU14-72GW20	OU14-72GW21	OU14-72GW24	OU14-72GW25	OU14-72GW26	OU14-72GW27	OU14-72GW28	OU14-72GW29	OU14-72GW38	OU14-72GW41	OU14-72GW43
Sample ID					OU14-72GW19-03D	OU14-72GW20-03D	OU14-72GW21-03D	OU14-72GW24-03D	OU14-72GW25-03D	OU14-72GW26-03D	OU14-72GW27-03D	OU14-72GW28-03D	OU14-72GW29-03D	OU14-72GW38-03D	OU14-72GW41-03D	OU14-72GW43-03D
Sample Date					10/31/03	10/24/03	10/30/03	10/23/03	10/23/03	10/23/03	10/23/03	10/22/03	10/22/03	10/27/03	10/27/03	10/27/03
Chemical Name																
Volatile Organic Compounds (UG/L)																
1,1-Dichloroethane	--	700	--	810	**0.9 J**	**2 J**	5 U	**0.2 J**	**2 J**	5 U	**130**	**3 J**	**0.5 J**	5 U	5 U	5 U
1,1-Dichloroethene	7	7	--	340	**0.6 J**	**0.4 J**	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dichloroethane	5	**0.38**	--	**0.12**	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chloromethane	--	**2.6**	--	**1.5**	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Methylene chloride	**5**	**5**	--	**4.3**	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Tetrachloroethene	5	**0.7**	--	**0.66**	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Trichloroethene	**5**	**2.8**	--	**0.028**	**22 (1,2,4)**	5 U	5 U	5 U	5 U	5 U	**5 J (2,4)**	5 U	**1 J (4)**	5 U	5 U	5 U
Vinyl chloride	**2**	**0.015**	--	**0.02**	5 U	5 U	**4 J (1,2,4)**	5 U	5 U	5 U	**2 J (2,4)**	5 U	5 U	5 U	5 U	5 U
cis-1,2-Dichloroethene	**70**	**70**	--	**61**	**110 (1,2,4)**	5 U	**3 J**	**23**	**2 J**	5 U	**19**	5 U	**1 J**	5 U	5 U	5 U
trans-1,2-Dichloroethene	100	70	--	120	**23**	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dichloroethene (total)	**70**	**70**	--	--	**140 (1,2)**	10 U	**3 J**	**23**	**2 J**	10 U	**19**	10 U	10 U	10 U	10 U	10 U
Total Metals (UG/L)																
Arsenic	**10**	**50**	--	**0.045**	2.13 U	2.13 U	**6 J (4)**	**2.8 J (4)**	2.13 U	**6.6 J (4)**	2.13 U	2.13 U	2.13 U	2.13 U	2.13 U	**2.5 J (4)**
Barium	2,000	2,000	--	2,600	**111**	**57.9**	**59.7**	**47.9**	**38.8**	**124**	**65.6**	**58.4**	**62.5**	**41.9**	**40.1**	**53.8**
Cadmium	5	5	--	18	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	**0.53 J**	0.25 U	0.25 U	0.25 U
Chromium	100	50	--	--	**2 J**	0.88 U	**2.3 J**	0.88 U	0.88 U	0.88 U	**1.3 J**	**1.6 J**	**2.1 J**	0.88 U	0.88 U	0.88 U
Lead	15	15	--	--	**4 J**	1.56 U	1.56 U	1.7 U	2.5 U	1.56 U	2.2 U	**5.8**	**8.6**	1.56 U	1.56 U	**1.6 J**
Mercury	2	1.1	--	--	**0.07 J**	0.04 UJ	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	**0.05 J**	0.04 UJ	0.04 UJ
Selenium	50	50	--	180	2.32 U	2.32 U	2.32 U	2.32 U	2.32 U	2.32 U	2.32 U	2.32 U	**2.7 J**	**2.3 J**	2.32 U	2.32 U
Silver	--	18	100	180	1.16 U	1.16 U	1.16 U	1.16 U	1.16 U	1.16 U	1.16 U	1.16 U	1.16 U	1.16 U	1.16 U	1.16 U
Wet Chemistry (MG/L)																
Nitrate	10	10	--	10	0.05 U	0.05 U	0.05 U	**0.42 J**	0.05 U	0.05 U	0.05 U	**1.9 J**	0.05 U	**0.74**	**0.097**	0.05 U
Sulfate	--	**250**	**250**	--	**12**	**14**	**25**	**14**	**14**	**29**	**51**	**260 (2,3)**	**27**	**39**	**8.4**	**28**

1. Sample ID scheme example:
   OU14 - Operable Unit 14
   13 - UST Program Site Designation
   GW02- groundwater sample, location 02
   03D - sample collected 2003, 3rd quarter
2. Detections of a chemical are indicated by bold font.
3. Detections that exceed one or more screening criteria are indicated by bold red font.
4. Screening criteria exceeded at least once are also indicated by bold red font.
5. Data entries consist of the concentration followed by the data qualifier (if any) followed by the reference number(s).
6. J - analyte present, reported value is estimated
7. R - unreliable result
8. U - Not Detected
9. "--" - no screening criteria established
10. * - Duplicate sample collected at this location

File Path: v:\18gis\mcas_cherrypoint\figures\phase1-ri_ou14-site90.apr

OU14-56GW12
No exceedances

OU14-56GW06
No exceedances

OU14-66GW46	Conc.
VOCs (UG/L)	
1,2-Dichloroethane	0.3 J (4)
Benzene	0.8 J (4)
Trichloroethene	1 J (4)
Total Metals (UG/L)	
No exceedances	

OU14-66GW06	Conc.
VOCs (UG/L)	
No exceedances	
Total Metals (UG/L)	
Arsenic	42.4 (1,4)

OU14-66GW47	Conc.
VOCs (UG/L)	
Benzene	2 J (2,4)
Trichloroethene	8 (1,2,4)
Total Metals (UG/L)	
Arsenic	69.9 (1,2,4)

OU14-66GW07
No exceedances

OU14-66GW13
No exceedances

OU14-66GW20	Conc.
VOCs (UG/L)	
No exceedances	
Total Metals (UG/L)	
Arsenic	2.3 J (4)

OU14-56GW09	Conc.
VOCs (UG/L)	
1,2-Dichloroethane	0.4 J (2,4)
Benzene	16 (1,2,4)
Trichloroethene	98 (1,2,4)
Total Metals (UG/L)	
Arsenic	6.6 J (4)

OU14-56GW13	Conc.
VOCs (UG/L)	
Benzene	330 (1,2,4)
Cumene	97 (2)
Cyclohexane	460 (2)
Ethylbenzene	230 (2,4)
Xylene, total	960 (2,4)
m- and p-Xylene	800 (2)
Total Metals (UG/L)	
Arsenic	39.3 (1,4)

OU14-66GW05	Conc.
VOCs (UG/L)	
No exceedances	
Total Metals (UG/L)	
Arsenic	2.8 J (4)

OU14-66GW14	Conc.
VOCs (UG/L)	
Benzene	28 (1,2,4)
Total Metals (UG/L)	
No exceedances	

OU14-56GW23
No exceedances

OU14-66GW10
No exceedances

OU14-72GW41
No exceedances

OU14-72GW38
No exceedances

OU14-13GW20
No exceedances

OU14-56GW02	Conc.
VOCs (UG/L)	
1,2-Dichloroethane	7 (1,2,4)
Benzene	160 (1,2,4)
Cyclohexane	7 (2)
Tetrachloroethene	1 J (2,4)
Trichloroethene	150 (1,2,4)
Total Metals (UG/L)	
No exceedances	

OU14-13GW120A	Conc.
VOCs (UG/L)	
1,1,2-Trichloro-1,2,2-trifluoroethane(Freon-113)	23 (2)
Benzene	1 J (4)
Total Metals (UG/L)	
Arsenic	4.9 J (4)

OU14-13GW11	Conc.
VOCs (UG/L)	
Benzene	4 J (2,4)
Trichloroethene	3 J (2,4)
cis-1,2-Dichloroethene	190 (1,2,4)
Total Metals (UG/L)	
No exceedances	

OU14-56GW07	Conc.
VOCs (UG/L)	
Benzene	13 (1,2,4)
Cyclohexane	2 J (2)
Ethylbenzene	98 (2,4)
Total Metals (UG/L)	
No exceedances	

OU14-66GW37
No exceedances

OU14-72GW43	Conc.
VOCs (UG/L)	
No exceedances	
Total Metals (UG/L)	
Arsenic	2.5 J (4)

OU14-66GW33	Conc.
VOCs (UG/L)	
1,2-Dichloroethane	0.5 J (2,4)
Benzene	2 J (2,4)
Cyclohexane	3 J (2)
Total Metals (UG/L)	
No exceedances	

OU14-13GW19	Conc.
VOCs (UG/L)	
Benzene	0.5 J (4)
Total Metals (UG/L)	
Arsenic	2.5 J (4)

OU14-66GW34	Conc.
VOCs (UG/L)	
1,1,2-Trichloro-1,2,2-trifluoroethane(Freon-113)	19 (2)
Benzene	2 J (2,4)
Trichloroethene	4 J (2,4)
Vinyl chloride	0.6 J (2,4)
Total Metals (UG/L)	
No exceedances	

OU14-66GW28	Conc.
VOCs (UG/L)	
Benzene	310 (1,2,4)
Cyclohexane	23 J (2)
Ethylbenzene	78 (2,4)
Methylene chloride	7 J (1,2,4)
Total Metals (UG/L)	
No exceedances	

OU14-13GW17	Conc.
VOCs (UG/L)	
Benzene	2 J (2,4)
Total Metals (UG/L)	
No exceedances	

OU14-13GW12	Conc.
VOCs (UG/L)	
Trichloroethene	5 (2,4)
Vinyl Chloride	0.4 J (2,4)
Total Metals (UG/L)	
No Exceedances	

OU14-72GW19	Conc.
VOCs (UG/L)	
Benzene	0.8 J (4)
Trichloroethene	22 (1,2,4)
cis-1,2-Dichloroethene	110 (1,2,4)
Total Metals (UG/L)	
No exceedances	

OU14-13GW135	Conc.
VOCs (UG/L)	
1,2-Dichloroethane	1 J (2,4)
Benzene	260 (1,2,4)
Chloromethane	3 J (2,4)
Cyclohexane	14 (2)
Ethylbenzene	70 (2,4)
Total Metals (UG/L)	
Arsenic	6 J (4)

OU14-72GW09
No exceedances

OU14-72GW20
No exceedances

OU14-72GW06
No exceedances

OU14-72GW18	Conc.
VOCs (UG/L)	
No exceedances	
Total Metals (UG/L)	
Arsenic	5.1 J (4)

OU14-72GW21	Conc.
VOCs (UG/L)	
Benzene	1 J (4)
Vinyl chloride	4 J (1,2,4)
Total Metals (UG/L)	
Arsenic	6 J (4)

OU14-13GW29	Conc.
VOCs (UG/L)	
Benzene	2000 (1,2,4)
Cyclohexane	43 J (2)
Ethylbenzene	130 (2,4)
Methyl-tert-butyl ether (MTBE)	170 (4)
Xylene, total	730 (2,4)
cis-1,2-Dichloroethene	65 J (4)
m- and p-Xylene	710 (2)
Total Metals (UG/L)	
No exceedances	

OU14-13GW143	Conc.
VOCs (UG/L)	
Benzene	38 (1,2,4)
Cyclohexane	24 (2)
Trichloroethene	8 (1,2,4)
Total Metals (UG/L)	
No exceedances	

OU14-72GW24	Conc.
VOCs (UG/L)	
Benzene	0.5 J (4)
Total Metals (UG/L)	
Arsenic	2.8 J (4)

OU14-72GW10	Conc.
VOCs (UG/L)	
No exceedances	
Total Metals (UG/L)	
Arsenic	22.4 (1,4)

OU14-13GW144	Conc.
VOCs (UG/L)	
Benzene	16 (1,2,4)
Cyclohexane	2 J (2)
Trichloroethene	6 (1,2,4)
Total Metals (UG/L)	
No exceedances	

OU14-13GW05	Conc.
VOCs (UG/L)	
No exceedances	
Total Metals (UG/L)	
Arsenic	3.9 J (4)

OU1-MW61	Conc.
VOCs (UG/L)	
1,2-Dichloroethane	1 J (2,4)
Benzene	8 (1,2,4)
Cyclohexane	6 (2)
Vinyl Chloride	110 (1,2,4)
Total Metals (UG/L)	
Arsenic	8.2 (4)

OU14-72GW04	Conc.
VOCs (UG/L)	
Benzene	70 (1,2,4)
Cyclohexane	92 (2)
Ethylbenzene	9 (4)
Vinyl chloride	28 (1,2,4)
Total Metals (UG/L)	
Arsenic	40 (1,4)

OU14-66GW29	Conc.
VOCs (UG/L)	
Benzene	4 J (2,4)
Cyclohexane	37 (2)
Trichloroethene	5 (2,4)
Total Metals (UG/L)	
No exceedances	

OU14-72GW15	Conc.
VOCs (UG/L)	
Benzene	0.7 J (4)
Cyclohexane	5 J (2)
Total Metals (UG/L)	
Arsenic	3.4 J (4)

OU1-MW62	Conc.
VOCs (UG/L)	
1,2-Dichloroethane	0.5 J (2,4)
Benzene	1 J (4)
Cyclohexane	6 (2)
Total Metals (UG/L)	
No exceedances	

OU14-72GW07	Conc.
VOCs (UG/L)	
Benzene	66 (1,2,4)
Cyclohexane	64 (2)
Total Metals (UG/L)	
No exceedances	

OU14-72GW02
No exceedances

OU14-72GW27	Conc.
VOCs (UG/L)	
Benzene	4 J (2,4)
Cyclohexane	11 (2)
Trichloroethene	5 J (2,4)
Vinyl chloride	2 J (2,4)
Total Metals (UG/L)	
No exceedances	

OU14-72GW28
No exceedances

OU14-72GW29	Conc.
VOCs (UG/L)	
Benzene	6 (1,2,4)
Cumene	85 (2)
Cyclohexane	8 (2)
Trichloroethene	1 J (4)
Total Metals (UG/L)	
No exceedances	

OU14-72GW25	Conc.
VOCs (UG/L)	
Cyclohexane	5 (2)
Total Metals (UG/L)	
No exceedances	

OU14-72GW12	Conc.
VOCs (UG/L)	
Cyclohexane	5 (2)
Total Metals (UG/L)	
No exceedances	

OU14-72GW26	Conc.
VOCs (UG/L)	
No exceedances	
Total Metals (UG/L)	
Arsenic	6.6 J (4)

OU14-72GW14
No exceedances

Chemical	MCL Groundwater (1)	NC-GW 2 L (2)	Region IX PRGs Tap Water (4)
Volatile Organic Compounds (UG/L)			
1,1,2-Trichloro-1,2,2-trifluoroethane(Freon-113)	--	0	59,000
1,2-Dichloroethane	5	0.38	0.12
1,2-Dichloroethene (total)	70	70	--
Benzene	5	1	0.34
Chloromethane	--	2.6	1.5
Cumene	--	70	660
Cyclohexane	--	0	35,000
Ethylbenzene	700	29	2.9
Methyl-tert-butyl ether (MTBE)	--	200	13
Methylene chloride	5	5	4.3
Tetrachloroethene	5	0.7	0.66
Trichloroethene	5	2.8	0.028
Vinyl chloride	2	0.015	0.02
Xylene, total	10,000	530	210
cis-1,2-Dichloroethene	70	70	61
m- and p-Xylene	--	530	--
Total Metals (UG/L)			
Arsenic	10	50	0.045

LEGEND

- Monitoring Well Locations
- Buildings
- Roads
- Water Bodies

J - Reported value is estimated

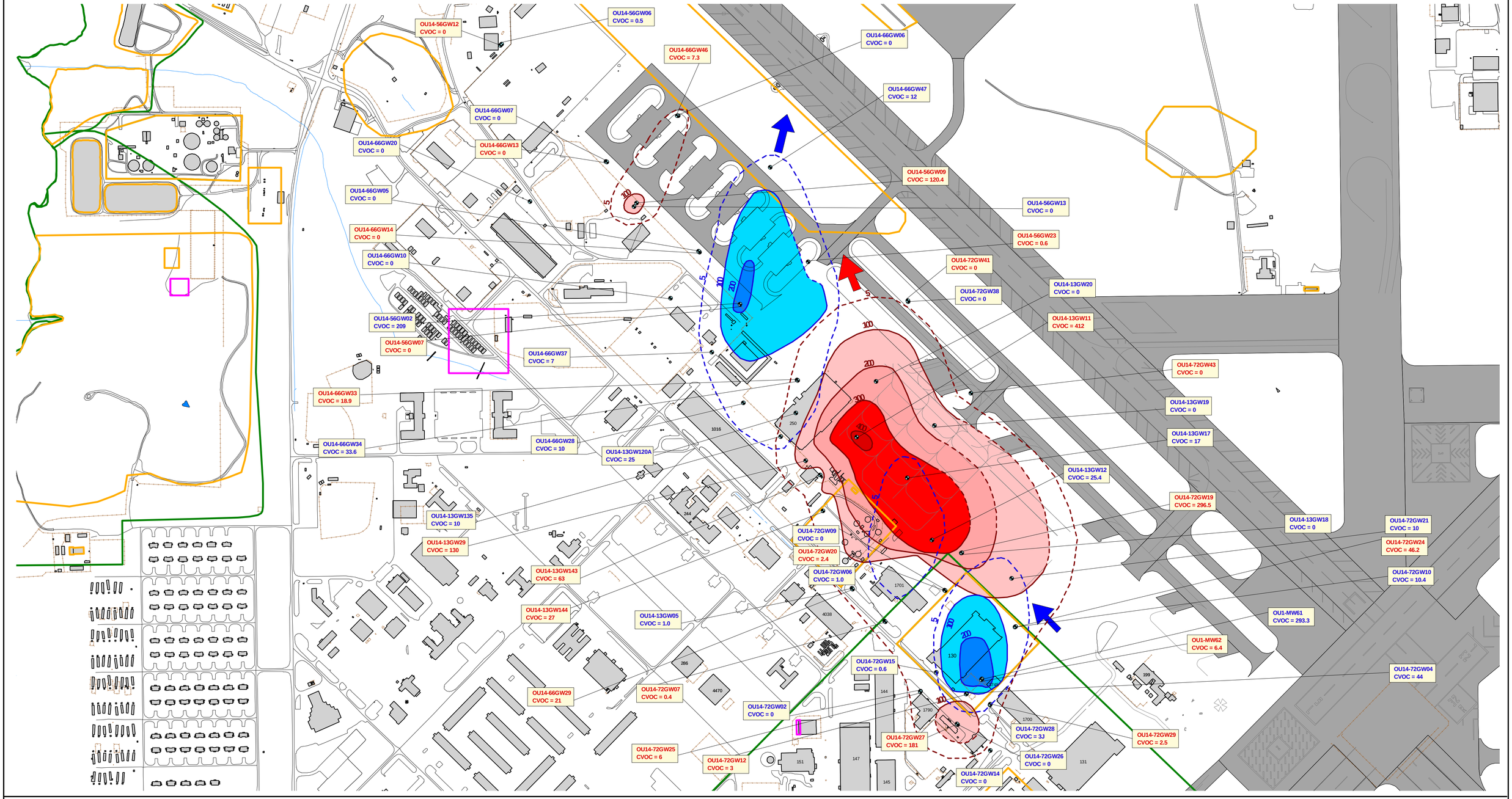
Notes:
Number in parentheses indicates screening criteria exceeded.
All results are in micrograms per liter (ug/L).
No exceedances of Secondary MCLs (only applicable to sulfate and silver) were found, with the exception of sulfate at OU1-GW62, 72GW12, and 72GW28. It is not presented in this figure, but is listed in Table 3.

N

0 400 800 1200 Feet

Figure 4-1
Phase II RI Groundwater VOC and Metals Exceedances
OU14, Site 90
MCAS Cherry Point

File Path: v:\18gis\mcas_cherrypoint\figures\phase1-ri_ou14-site90.apr



LEGEND

- Monitoring Well Locations
- Buildings
- Roads
- Water Bodies
- 293 Total Chlorinated Volatile Organic Compounds (CVOCs) - Upper Surficial Aquifer
- 296 Total Chlorinated Volatile Organic Compounds (CVOCs) - Lower Surficial Aquifer

Groundwater Flow Direction - Upper Surficial Aquifer

Groundwater Flow Direction - Lower Surficial Aquifer

All results are in micrograms per liter (ug/L).

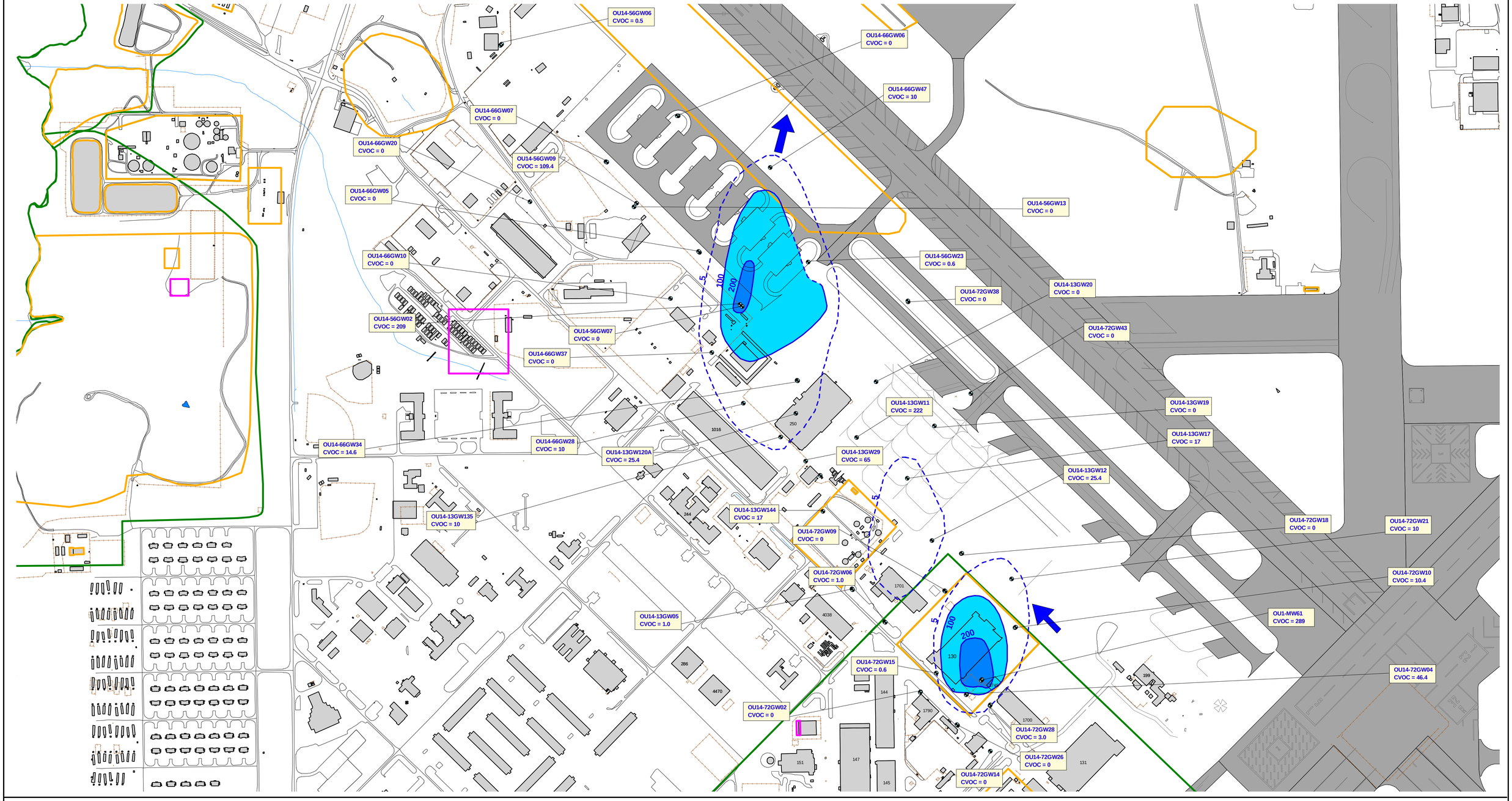
- 5-100
- 100-200
- 200-300
- 300-400
- > 400

N

0 400 800 1200 Feet

Figure 4-2
Phase II RI CVOC Isoconcentration Map
OU14, Site 90
MCAS Cherry Point

File Path: v:\18gis\mcas_cherrypoint\figures\phase1-ri_ou14-site90.apr



LEGEND

- Monitoring Well Locations
- Buildings
- Roads
- Water Bodies
- 293 Total Chlorinated Volatile Organic Compounds (CVOCs) - Upper Surficial Aquifer

Groundwater Flow Direction - Upper Surficial Aquifer

All results are in micrograms per liter (ug/L).

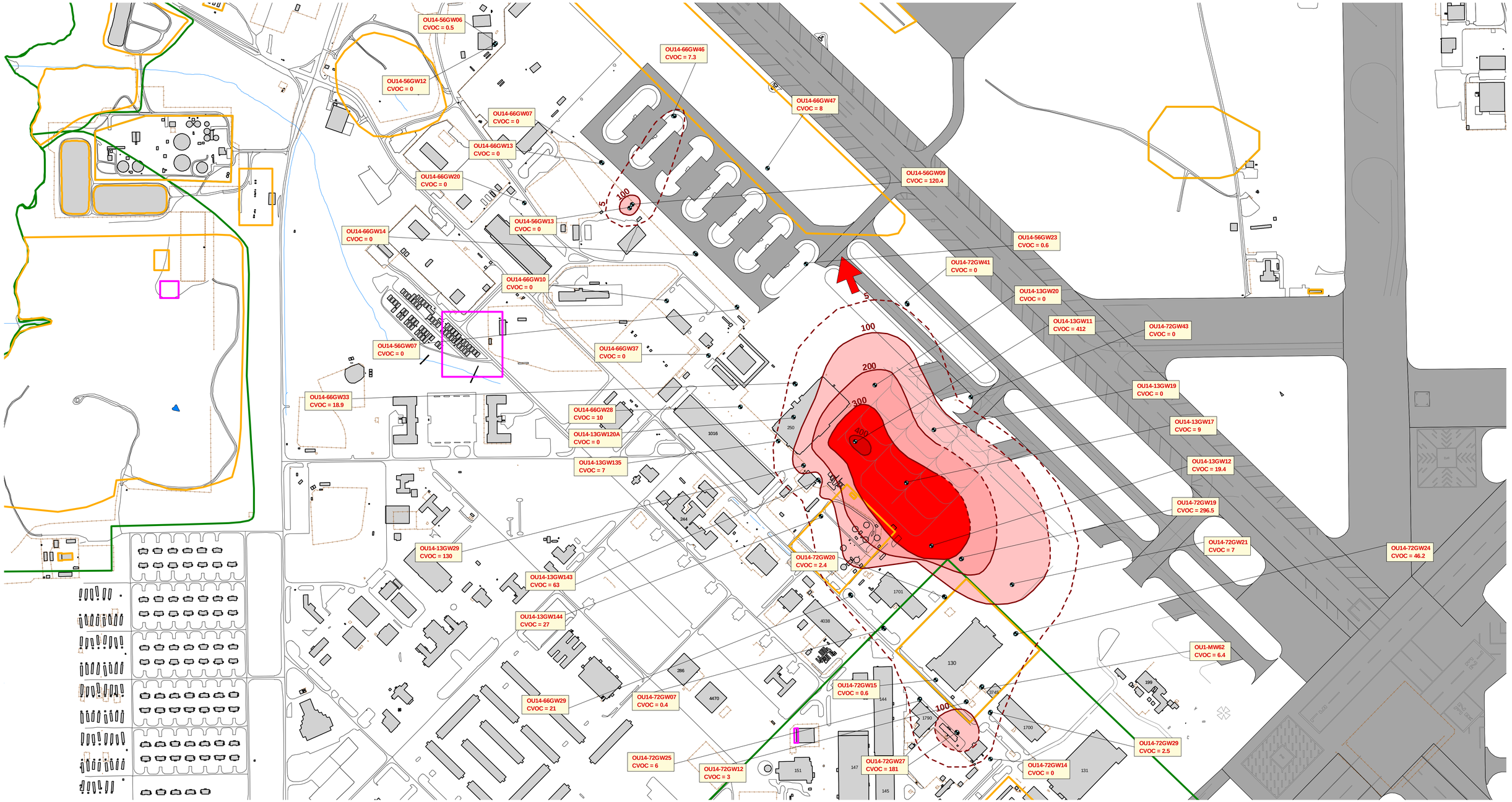
- 5-100
- 100-200
- 200-300

N

0 400 800 1200 Feet

Figure 4-3
Phase II RI CVOC Isoconcentration Map
Upper Surficial Aquifer
OU14, Site 90
MCAS Cherry Point

File Path: v:\18gis\mcas_cherrypoint\figures\phase1-ri_ou14-site90.apr



LEGEND

- Monitoring Well Locations
- Buildings
- Roads
- Water Bodies
- 296 Total Chlorinated Volatile Organic Compounds (CVOCs) - Lower Surficial Aquifer

Groundwater Flow Direction - Lower Surficial Aquifer

All results are in micrograms per liter (ug/L).

- 5-100
- 100-200
- 200-300
- 300-400
- > 400

N

0 400 800 1200 Feet

Figure 4-4
Phase II RI CVOC Isoconcentration Map
Lower Surficial Aquifer
OU14, Site 90
MCAS Cherry Point

SECTION 5

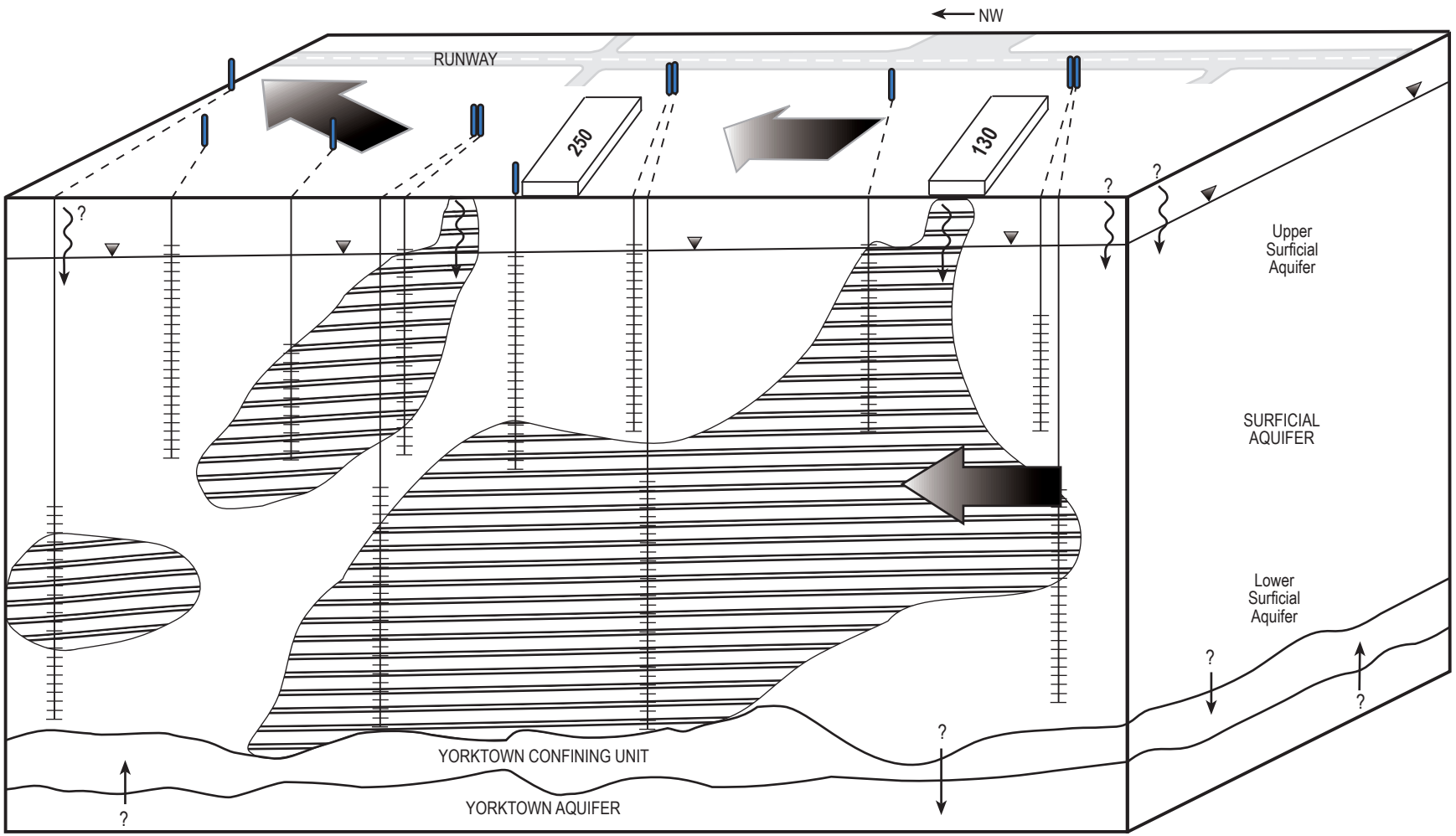
Interpretation of Data

As described in the previous section and illustrated in **Figure 4-3,** the lateral distribution of CVOCs in the upper portion of the surficial aquifer is discontinuous. There are two main areas of CVOC detections: the Heavy Fuel pits area and the Building 130 area. As illustrated in **Figure 4-4**, the lateral distribution of CVOCs in the lower portion of the surficial aquifer is continuous except for one outlying area near the Heavy Fuel pits.

Presently, there are no confirmed pathways from potential CVOC sources previously identified (e.g., Building 130 wash rack) to the groundwater at OU14, Site 90 because of the lack of positively identified CVOCs in the unsaturated zone. Possible pathways to the groundwater may have been storm water drainage lines, sanitary sewer lines, industrial wastewater lines, and/or CVOC spills. There is an interconnected system of storm water drainage lines throughout the areas of CVOC detections in the upper portion of the surficial aquifer. CVOCs may have been introduced via leaky storm water drainage lines after rainwater flushed wastes from the aircraft wash rack into the system. Likewise, the sanitary and industrial sewer systems each have interconnected lines throughout the area of concern, which may have transported wastewater-containing CVOCs through leaky pipes. It is possible that Building 130, an aircraft maintenance and storage hangar, flushed wastes to both of these systems.

The data indicate that one of the two areas of CVOC detections in the upper surficial aquifer is correlated to the CVOC impact observed in the lower portion of the aquifer. This is depicted in the conceptual model of the site (**Figure 5-1)**. For example, the well pair 72GW10 (upper surficial aquifer) and 72GW24 (lower surficial aquifer), are screened in different portions of the surficial aquifer, and both exhibit detections of CVOCs. **Figure 5-1** also shows the smaller plume in the upper portion of the surficial aquifer and probably a separate lower surficial aquifer CVOC-impacted area. Approximately 500 lateral feet separates these two individual plumes.

The presence of PCE and TCE and their associated degradation products in each of the areas of CVOC detections indicates that natural attenuation is occurring.



LEGEND

- INFILTRATION
- AREA GROUNDWATER FLOW DIRECTION
- LOCAL GROUNDWATER FLOW DIRECTION
- BUILDING
- IMPACTED GROUNDWATER
- MONITORING WELL
- WATER TABLE
- ? INFERRED DIRECTION

Figure 5-1

Phase II RI Conceptual Model of CVOC Plumes
OU14, Site 90
MCAS Cherry Point, North Carolina

CH2MHILL

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SECTION 6

Recommendations for Phase III RI Activities

Upon reviewing of the Phase I and II groundwater sampling data and UST program CVOC groundwater data, the following actions are recommended:

- Further evaluation of historical and current processes/activities taking place at buildings adjacent to 56GW02 to determine the potential sources of CVOCs found at that well. This investigation should include the possible locations of utility lines as well as the locations of any USTs not previously identified.
- Overlaying utility line locations from any accessible MCAS historical records on existing CVOC plume maps to identify correlations for potential sources.
- Soil sampling during the installation of new monitoring wells to locate potential sources. Detailed vertical profiling will be conducted.
- Investigation of the upper and lower surficial aquifer upgradient of 72GW27.
- Limited investigation of the Yorktown aquifer.
- Investigation of the groundwater southeast (upgradient and lateral) of the large, lower surficial aquifer plume in the vicinity of Building 250 that trends northwest–southeast.
- Investigation of the lower surficial aquifer groundwater in the vicinity of 56GW09 radially to determine the extent of contamination.
- Determination of hydraulic conductivities of the upper and lower surficial aquifer at OU14, Site 90, by performing slug tests.
- Conduct a comprehensive groundwater elevation survey to produce detailed potentiometric surface maps and determine why groundwater shifts from the northeast to the west–northwest within such a limited area. The mechanism behind this the change in groundwater flow may yield information on the dynamics of plume migration at OU14.

Table 6-1 summarizes the sampling plan for Phase III RI activities and includes rationales for the installation of additional MWs. Additional MWs should be installed to further delineate the CVOC plumes and to better define how these plumes are migrating through the subsurface**. Figures 6-1 and 6-2** show the locations of the proposed MWs and the existing wells that are recommended for sampling. During the installation of all new wells, soil will be screened from the surface to the water table, and will potentially be sampled (depending on the PID readings) to try and definitively locate source areas. Natural attenuation parameters will be analyzed for in a subset of groundwater samples to further assess the groundwater conditions as they relate to the potential for the biological degradation of CVOCs.

The Phase III RI activities are intended to provide data that can be used to determine the nature and extent of the CVOC impact on the surficial aquifer and potentially the Yorktown Aquifer, and to determine potential remedial actions that would be appropriate for the site.

An HHRA will be conducted in the final RI using the most recent CVOC groundwater and soil data from each location. However, an ERA does not appear to be warranted because of a lack of receptors. The site is almost completely paved with concrete.

The proposed Phase III RI activities include a preliminary examination of indoor air quality and potential effect on human health. After reviewing relevant guidelines, it does not appear CVOC contamination potentially vaporizing into buildings poses a risk to human health, but a study of possible exposure pathways will be identified and investigated.

The activities proposed for the Phase III investigation are intended to fill current data gaps and provide the necessary information to complete the RI for the site. In addition, the data collected will assist in the evaluation of potential remedies to be evaluated in the Feasibility Study.

Table 6-1
Proposed Sampling Plan for Phase III RI
OU14 Site 90 Cherry Point

Well ID	Shallow or Deep	GW Level	Vertical GW Sampling	Soil Screening for potential Sampling[1]	Installation of new well	Sample for VOCs	Sample for Nutrients (N, P)	Sample for Geochemistry Suite[2]	Sample for TOC	Sample for Methane, Ethene, CO2	Comments
13GW05	shallow	x	---	---	---	---	---	---	---	---	
13GW11	deep	x	---	---	---	x	x	x	x	x	TCE=3J ug/L, cis=190 ug/L; middle of deep plume
13GW12	shallow	x	---	---	---	x	---	---	---	x	VC=0.5 ug/L, TCE=5 ug/L, ORP -172
13GW120A	shallow	x	---	---	---	---	---	---	---	---	
13GW135	shallow	x	---	---	---	---	---	---	---	---	
13GW143	deep	x	---	---	---	x	---	---	---	---	TCE=8 ug/L
13GW144	deep	x	---	---	---	x	---	---	---	---	
13GW15	shallow	x	---	---	---	---	---	---	---	---	TCE=6 ug/L
13GW16	shallow	x	---	---	---	---	---	---	---	---	
13GW17	shallow	x	---	---	---	x	---	---	---	---	
13GW19	shallow	x	---	---	---	---	---	---	---	---	ORP -100
13GW20	shallow	x	---	---	---	---	---	---	---	---	
13GW29	deep	x	---	---	---	x	---	---	---	---	cis=65 J ug/L
18GW21	shallow	x	---	---	---	x	---	---	---	---	
18GW25	shallow	x	---	---	---	x	---	---	---	---	
56GW02	shallow	x	---	---	---	x	x	x	x	x	TCE=150 ug/L, PCE=1J ug/L; Middle of plume
56GW06	shallow	x	---	---	---	---	---	---	---	---	
56GW09	deep	x	---	---	---	x	x	x	x	x	TCE=98 ug/L
56GW12	deep	x	---	---	---	---	---	---	---	---	
56GW13	shallow	x	---	---	---	---	---	---	---	---	
56GW23	deep	x	---	---	---	---	---	---	---	---	
56GW47	shallow	x	---	---	---	x	---	x	x	x	TCE=8 ug/L; Leading edge of plume
66GW02	shallow	x	---	---	---	x	---	x	x	---	
66GW03	shallow	x	---	---	---	x	---	---	---	---	
66GW05	shallow	x	---	---	---	---	---	---	---	---	
66GW06	shallow	x	---	---	---	---	---	---	---	---	
66GW07	shallow or deep?	x	---	---	---	---	---	---	---	---	
66GW10	shallow	x	---	---	---	---	---	---	---	---	
66GW13	deep	x	---	---	---	---	---	---	---	---	
66GW14	deep	x	---	---	---	---	---	---	---	---	
66GW20	shallow	x	---	---	---	---	---	---	---	---	
66GW28	shallow	x	---	---	---	x	---	---	---	---	MC=7J ug/L
66GW29	deep	x	---	---	---	x	---	---	---	---	
66GW30	shallow	x	---	---	---	---	---	---	---	---	
66GW33	deep	x	---	---	---	---	---	---	---	---	
66GW34	shallow	x	---	---	---	x	x	x	x	x	VC=0.6J ug/L, TCE=4J ug/L; upgradient boundary
66GW35	shallow	x	---	---	---	x	---	---	---	---	
66GW36	shallow	x	---	---	---	x	---	x	x	x	
66GW37	shallow	x	---	---	---	---	---	---	---	---	
66GW46	deep	x	---	---	---	x	---	---	---	---	TCE=1 J ug/L; downgradient of small deep plume
66GW49	shallow	x	---	---	---	x	---	---	---	---	
72GW02	shallow	x	---	---	---	---	---	---	---	---	
72GW06	shallow	x	---	---	---	---	---	---	---	---	
72GW07	deep	x	---	---	---	---	---	---	---	---	
72GW09	shallow	x	---	---	---	---	---	---	---	---	
72GW10	shallow	x	---	---	---	x	---	---	---	---	
72GW12	deep	x	---	---	---	---	---	---	---	---	
72GW14	shallow	x	---	---	---	---	---	---	---	---	
72GW15	shallow	x	---	---	---	---	---	---	---	---	
72GW18	shallow	x	---	---	---	---	---	---	---	---	
72GW19	deep	x	---	---	---	x	x	x	x	x	TCE=22 ug/L, cis=110 ug/L
72GW20	deep	x	---	---	---	---	---	---	---	---	
72GW21	shallow	x	---	---	---	x	---	x	x	x	VC=4 ug/L; down/cross-gradient of plume
72GW24	deep	x	---	---	---	---	---	---	---	---	
72GW25	deep	x	---	---	---	---	---	---	---	---	
72GW28	shallow	x	---	---	---	x	---	---	---	---	
72GW26	shallow	x	---	---	---	---	---	---	---	---	
72GW27	deep	x	---	---	---	x	---	x	x	x	TCE=5J ug/L, VC=2J ug/L; Upgradient finger of CVOCs
72GW27	deep	x	---	---	---	---	---	---	---	---	TCE=1J ug/L
72GW33	shallow	x	---	---	---	---	---	---	---	---	
72GW36	shallow	x	---	---	---	---	---	---	---	---	
72GW37	shallow	x	---	---	---	---	---	---	---	---	
72GW38	shallow	x	---	---	---	---	---	---	---	---	
72GW41	deep	x	---	---	---	---	---	---	---	---	
72GW43	deep	x	---	---	---	---	---	---	---	---	
72GW44	shallow	x	---	---	---	---	---	---	---	---	

Table 6-1
Proposed Sampling Plan for Phase III RI
OU14 Site 90 Cherry Point

Well ID	Shallow or Deep	GW Level	Vertical GW Sampling	Soil Screening for potential Sampling[1]	Installation of new well	Sample for VOCs	Sample for Nutrients (N, P)	Sample for Geochemistry Suite[2]	Sample for TOC	Sample for Methane, Ethene, CO2	Comments
72GW45	shallow	x	---	---	---	---	---	---	---	---	
72GW46	shallow	x	---	---	---	---	---	---	---	---	
72GW48	shallow	x	---	---	---	---	---	---	---	---	
90GW17	yorktown	x	---	---	x	x	---	---	---	---	
90GW18	yorktown	x	x	---	x	x	---	---	---	---	
MW61	shallow	x	---	---	---	x	x	x	x	x	VC=110 ug/L; Center of plume
MW62	deep	x	---	---	---	---	---	---	---	---	
P3GW01	shallow	x	x	x	x	x	x	x	x	x	Vertical profile of plume in source area (in bldg.)
P3GW02	shallow	x	x	x	x	x	---	---	---	---	Extent of higher concentration plume downgradient
P3GW03	shallow	x	---	x	x	x	---	---	---	---	Downgradient delineation for VC at 72GW21
P3GW04	shallow	x	x	x	x	x	---	---	---	---	Extent of higher concentration plume upgradient
P3GW05	shallow	x	x	x	x	x	---	---	---	---	Extent of higher concentration plume crossgradient
P3GW06	shallow	x	x	x	x	x	---	---	---	---	Extent of higher concentration plume downgradient
P3GW07	shallow	x	---	x	x	x	---	x	x	---	Downgradient delineation for TCE at 66GW47
P3GW08	shallow	x	---	x	x	x	---	---	---	---	Downgradient delineation for TCE at 66GW47
P3GW09	deep	x	x	x	x	x	x	x	x	x	Directly downgradient of highest CVOC (cis at 13GW11
P3GW10	deep	x	x	x	x	x	---	---	---	---	Delineate N side of plume
P3GW11	deep	x	---	x	x	x	---	---	---	---	Delineate NE side of plume
P3GW12	deep	x	---	x	x	x	---	---	---	---	Delineate NE side of plume
P3GW13	deep	x	x	x	x	x	x	x	x	x	Delineate NE side of plume
P3GW14	deep	x	---	x	x	x	---	---	---	---	Delineate small NW area with up to 98 ug/L TCE
P3GW15	deep	x	---	x	x	x	---	---	---	---	Delineate small NW area with up to 98 ug/L TCE
P3GW16	deep	x	---	x	x	x	---	---	---	---	Delineate small NW area with up to 98 ug/L TCE
Total:		**90**	**9**	**16 (10 sampl.)**	**18**	**44**	**9**	**15**	**15**	**15**	

[1] Up to 10 soil samples from the 16 locations will be sent to the lab for analysis, depending on where PID screening indicates a sample is warranted.
[2] Nitrate, nitrite, total iron, ferrous iron, sulfate, sulfide, chloride

Notes:
When collecting VOC samples, geochemical parameters DO, T, pH, ORP, and conductivity will be measured and documented.
Hach field tests can be used for ferrous iron, manganese, CO2 and sulfate.
Two borings (P3GW9 and P3GW15) will be advanced to below the confining layer to obtain grab groundwater samples from the Yorktown Aquifer.
Slug tests will be conducted on two shallow wells and two deep wells to determine the hydraulic conductivity of the upper and lower surficial aquifer, respectively.
Six indoor air quality samples will be collected and analyzed. The loctions are as follows: two in Bldg. 130, two in Bldg. 250, one in Bldg. 4075 (500 ft NW of Bldg. 250), and one in Bldg. 1701.

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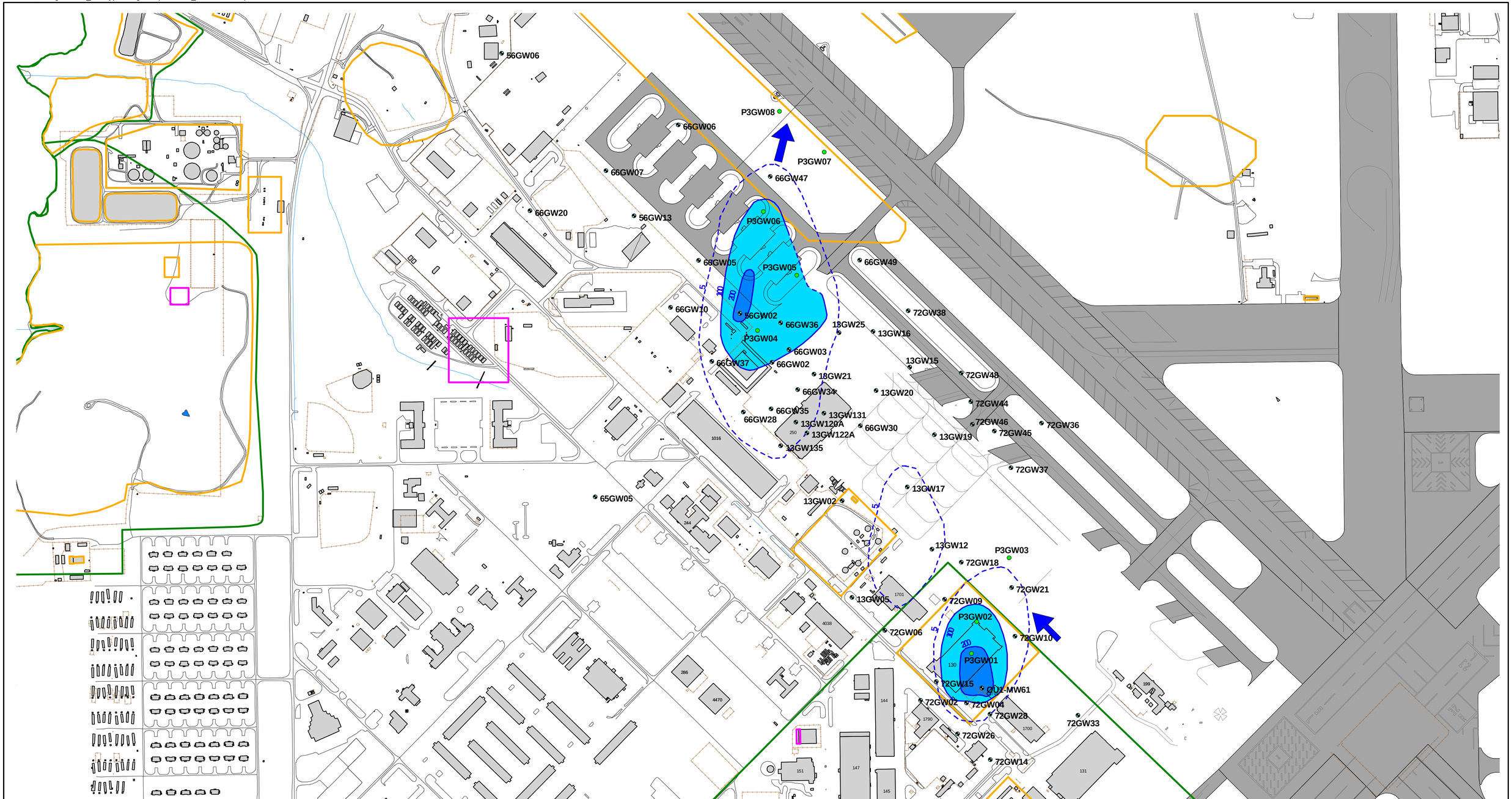

LEGEND

- Monitoring Well Locations
- Proposed Monitoring Well Locations
- Buildings
- Roads
- Water Bodies

Groundwater Flow Direction - Upper Surficial Aquifer

- 5-100 ug/L
- 100-200 ug/L
- 200-300 ug/L

N

0 400 800 1200 Feet

Figure 6-1
Monitoring Wells
Upper Surficial Aquifer
OU14, Site 90
MCAS Cherry Point

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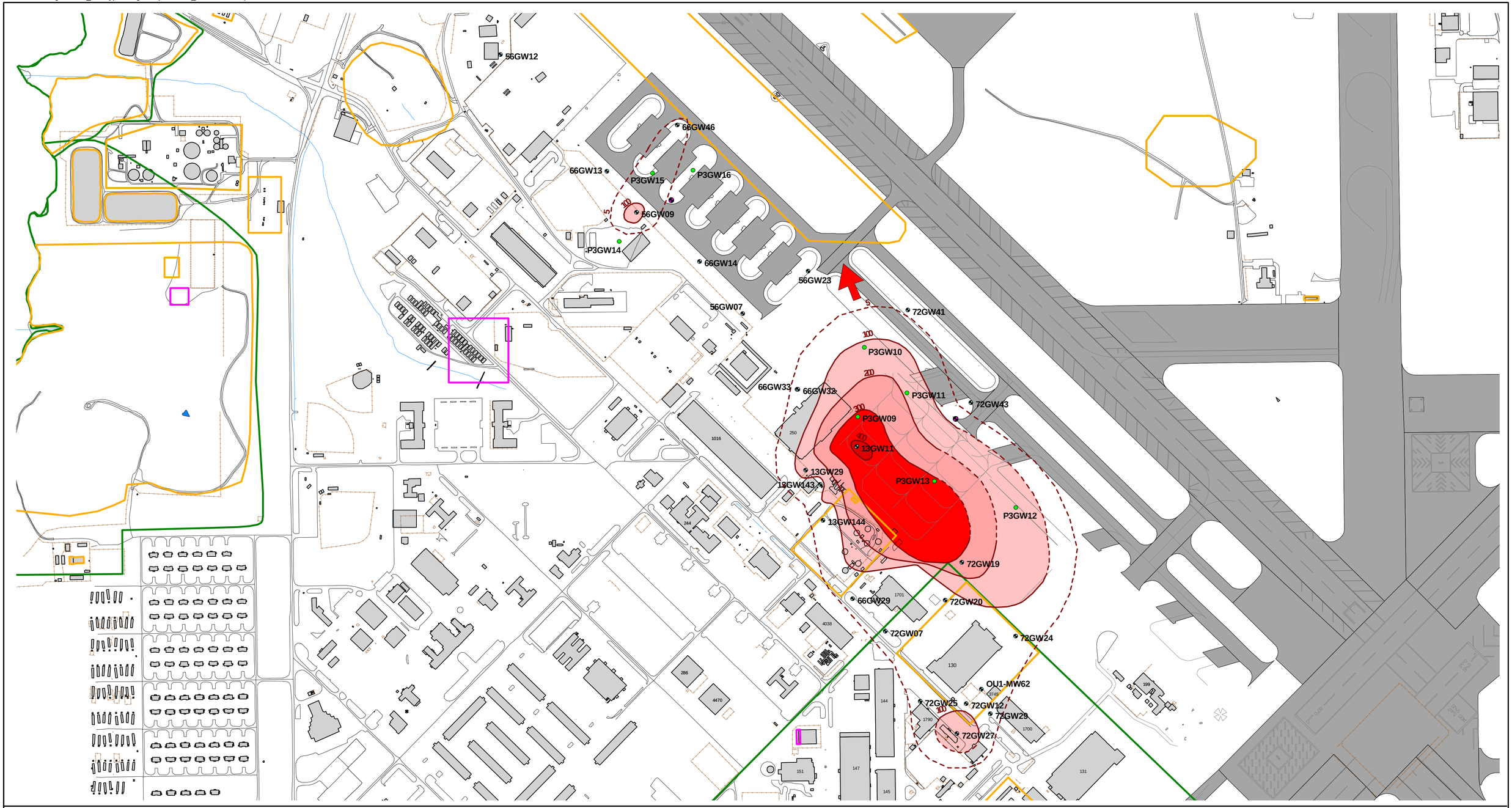

LEGEND

- Monitoring Well Locations
- Proposed Monitoring Well Locations
- Buildings
- Roads
- Water Bodies

Groundwater Flow Direction - Lower Surficial Aquifer

- 5-100 ug/L
- 100-200 ug/L
- 200-300 ug/L
- 300-400 ug/L
- > 400 ug/L

N

0 400 800 1200 Feet

Figure 6-2
Monitoring Wells
Lower Surficial Aquifer
OU14, Site 90
MCAS Cherry Point

SECTION 7

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Appendix A
Phase I Investigation

Final

Phase I
Remedial Investigation Interim Report
For Operable Unit 14, Site 90

Marine Corps Air Station
Cherry Point, North Carolina

Prepared for

Department of the Navy
Atlantic Division
Naval Facilities Engineering Command
Norfolk, Virginia

Contract No. N62470-95-D-6007
CTO-0209

October 2003

Prepared by

CH2MHILL

Contents

Tables

Figures

SECTION 1

Introduction

This technical memorandum (memo) describes the results of preliminary (Phase I) Remedial Investigation (RI) data collection activities at OU14, Site 90, and presents proposed follow on sampling activities to close identified data gaps. The preliminary investigation activities were performed for the purpose of delineating the concentrations and extent of chlorinated volatile organic compounds (CVOCs) in the lower and upper portions of the surficial aquifer. The activities described were completed in October 2002 in accordance with the RI work plan (CH2M HILL, 2002) for OU14, Site 90 at Marine Corps Air Station (MCAS) Cherry Point, North Carolina. Initially two phases of work were proposed to investigate the presence of CVOCs in groundwater at OU14, Site 90. Upon completion of the Phase I field investigation, data from ongoing groundwater monitoring as part of the UST program (in the vicinity of Tank Farm A, north and west of Site 90) was made available to the Site 90 RI team. These data, and the results of the Phase I sampling, indicated that CVOCs are present in groundwater to the north and west, beyond the extent of the Phase I investigation area. Consequently, it may be necessary to conduct an additional phase of data gap sampling (Phase III) following the proposed Phase II investigation presented in this memo. The proposed approach for the Phase III investigation, if necessary, will be presented following an evaluation of the Phase II investigation results.

The objective of the Phase I investigation was to determine the preliminary extent of CVOC contamination in the groundwater at Site 90 in advance of a Phase II investigation originally intended to close data gaps and include a more comprehensive suite of chemical analyses. As discussed above, the Phase II investigation will now be used to delineate the extent of CVOC contamination in groundwater within the expanded study area. If necessary, a Phase III investigation will be conducted to fill any data gaps evident from the first two investigation phases.

The overall objectives of the RI at Site 90 are to:

- Determine the nature and extent of CVOC groundwater contamination that may be associated with former non-petroleum sources in the OU14 area.
- Obtain sufficient data to support a human health risk assessment (HHRA). An ecological risk assessment (ERA) does not appear to be warranted due to a lack of receptors. The site is entirely paved over with concrete; however, exposed ground surface and surface water is present to the northwest of the site beyond the current extent of the investigation area. For the sake of completeness, the RI Report for OU14 will include a section entitled "Ecological Risk Assessment."

The results of the Phase I investigation activities and recommendations for the Phase II investigation are presented in this memo.

SECTION 2

Site Description and History

2.1 Site Description

Marine Corps Air Station (MCAS) Cherry Point is a 13,164-acre military reservation located adjacent to the City of Havelock in southeastern Craven County, North Carolina. Commissioned in 1942, MCAS Cherry Point provides support facilities and services for the Second Marine Aircraft Wing, the Naval Aviation Depot (NADEP), Service Support Detachment 21 of the Second Force Service Support Group (2nd FSSG), the Naval Air Maintenance Training Group Detachment, and the Defense Reutilization and Marketing Office (DRMO). MCAS Cherry Point maintains facilities for training and support of the Atlantic Fleet Marine Force (FMF) aviation units, and is designated as a primary aviation supply point.

The boundaries of MCAS Cherry Point include the Neuse River to the north, Hancock Creek to the east, North Carolina Highway 101 to the south, and a boundary approximately ¾-mile west of Slocum Creek to the west. **Figure 1** shows the general layout of MCAS Cherry Point.

OU14, Site 90 consists of the area including and surrounding Building 130, which is located in the west-central portion of the MCAS Cherry Point base flight-line complex, adjacent to Sixth Avenue (**Figure 2**). Building 130 is a large aircraft hangar that is approximately 450 ft long and 250 ft wide. The hangar consists of two large aircraft bays, storage rooms, and administrative offices. A broad expanse of concrete tarmac generally surrounds the building and extends northward and eastward to aircraft taxiways and runway 14L. A concrete airplane wash rack and small outbuildings are located adjacent to the southeast side of the building. Portions of an abandoned underground aviation pipeline generally surround Building 130. This pipeline network was previously used to refuel aircraft at multiple fueling stations. The only surface features that indicate the location of the abandoned pipeline network are two manhole covers, which provide access to pipeline junction vaults; the manholes are located in the two parking lots on the northwest and southeast sides of Building 130 near Sixth Avenue.

The airplane wash rack, located near the southeast side of Building 130, has apparently been used to wash aircraft and related equipment since the construction of Building 130 in the early 1940s. The wash rack is currently used to flush aircraft fuel drop tanks with water. The wash rack drains to a diversionary catch basin (located near Sixth Avenue) that is connected to the industrial sewer system. Portions of the sewer system are reportedly constructed of clay pipe, which may crack and break with age. Also, Building 3745 is located adjacent to the wash rack, and is used as a hazardous waste accumulation area. Building 1700, an aircraft maintenance hangar, is located to the southeast (and potentially upgradient) of the OU14 area.

Numerous underground utility lines and features are located within the project area, including sanitary sewer, stormwater, water, steam, communication lines, fuel lines, electrical lines, and USTs.

2.2 Site History

MCAS Cherry Point was commissioned in 1942. A massive aircraft assembly and repair facility, which later became the Naval Aviation Depot (NADEP), was added in 1943. Hazardous wastes have historically been generated through aircraft assembly and maintenance operations. These wastes have included plating wastes, organic solvents, paint removers and cleaners, oils and lubricants, waste petroleum, and polychlorinated biphenyls (PCBs). The Air Station was placed on the federal National Priorities List (NPL) in December 1994. Currently, the investigation and remediation process is ongoing at several operable units.

According to building construction drawings, Building 130, located within OU14, was reportedly constructed in the early 1940s to house and maintain seaplanes. The underground aviation pipeline network that surrounds the hangar was also apparently constructed at this time and was expanded several times before its abandonment. Records concerning when and how the pipeline system was abandoned are not available (Law, 1995).

The underground pipeline system includes two 12-inch and one 4-inch diameter pipelines that run adjacent to Sixth Avenue. The main pipelines branched off to multiple fueling stations, primarily located near the northeast, southeast, and northwest sides of Building 130. Another run of abandoned pipeline is located northwest of Building 130 and branches off to individual refueling stations in this area. The overall pipeline system consisted of several miles of pipeline, which was connected to Tank Farm A, located approximately 600 ft northwest of Building 130.

An addition to the southwest side of Building 130 was constructed in the 1950s (estimated) over a portion of the abandoned pipeline adjacent to Sixth Avenue and over a suspected lubrication oil/waste oil UST of unknown size that is assumed to have been abandoned in place. An addition to the northeast side of the building was also apparently constructed at this time over another suspected UST that is assumed to have been abandoned in place (a 1944 base construction drawing shows these USTs).

The aircraft wash rack was reportedly constructed at the same time as Building 130. History related to Building 4438 (hazardous material accumulation area) is not clear. Building 4438 is located between the aircraft wash rack and Building 3745.

Both petroleum-related compounds and CVOCs have been detected in groundwater beneath OU14, Site 90. The petroleum-related contamination consists primarily of benzene, toluene, ethylbenzene and xylenes (BTEX), as well as semi-volatile organic compounds (SVOCs), including naphthalene. This petroleum-related contamination is currently being addressed under the MCAS Cherry Point UST Program. Because of the presence of CVOCs in groundwater, Site 90 was identified as a new site in 1999 for inclusion in the Installation Restoration (IR) Program for MCAS Cherry Point. The source of the CVOCs is not definitively known at this time.

SECTION 3

Field Investigation of Groundwater Contamination

To determine the nature and extent of potential groundwater contamination at OU14, 19 initial locations were investigated in October 2002, in the vicinity of Building 130. Based on the analytical sample results at the initial 19 locations, an additional 8 locations were investigated. Grab groundwater samples were collected at each of the 27 locations (**Figure 3**) utilizing direct push technology (DPT). With the exception of one location (9005), a groundwater sample was collected at the top of the surficial aquifer (shallow sample) and at the base of the surficial aquifer (deep sample). No deep groundwater sample was collected at location 9005 due to the DPT rig hitting refusal at approximately 18 feet bgs. All of the groundwater samples were submitted to an off-site laboratory for the analysis of Target Compound List (TCL) VOCs.

Soil core samples for lithological characterization were collected at each of the 27 locations from the ground surface to the depth of the water table surface utilizing DPT. Samples were screened with a photoionization detector (PID), inspected visually for any indications of contamination such as staining, and were logged for lithology. Elevated PID readings and/or visual inspection indicated possible soil contamination at 9 locations. As a result, soil samples were collected from these locations and submitted to an off-site laboratory for the analysis of TCL VOCs. The 9 soil samples were collected at locations 9006 through 9009, 9021, and 9024 through 9027. The samples were collected from a 1-foot subsurface interval that varied in depth between locations based on the PID readings. The shallowest sample (9006SB0203) was collected from the 2 to 3-foot bgs interval, and the deepest sample (9025SB1011) was collected from the 10 to 11-foot bgs interval.

The 19 initial groundwater sample locations are identified as 9001 through 9019, and were pre-selected based on historical data. These initial locations are presented in the Final OU14, Site 90 Work Plan (CH2M HILL, 2002). The 8 additional groundwater sample locations (9020 through 9027) were selected to further delineate the CVOC plume based on the results of VOC analysis of the samples collected from the initial 19 locations.

Each location was investigated by advancing into the soil a 2-inch diameter, 4-foot long DPT soil sampling tool with an acetate-lined inner sleeve. The resulting 4-foot soil core was retrieved and opened to enable the soil core to be first screened with a PID and then to have the lithology logged. Multiple 4-foot soil cores were collected at each location until the depth of the water table was encountered (approximately 8-12 feet bgs). At the 9 locations where elevated PID readings and/or visual evidence of possible contamination was present, soil samples were collected from the soil cores with an Encore® sampling device, and submitted for off-site laboratory analysis of TCL VOCs.

Following the collection of soil core samples at each location, a 4-foot stainless steel groundwater sampling device was advanced an additional 4 feet beneath the water table for the collection of the upper surficial aquifer groundwater sample. A peristaltic pump and

polyethylene tubing were used to purge groundwater from the DPT groundwater sampling tool until turbidity was sufficiently reduced and a representative groundwater sample could be collected. The groundwater samples were collected from within the DPT groundwater sampling tool and drill rods using the "straw method". The disposable polyethylene tubing containing the representative groundwater sample was withdrawn from the sampling tool and was then allowed to drain to the sample vials. After the collection of the shallow groundwater sample, a decontaminated sampling device was advanced to the lower portion of the surficial aquifer, ranging from 40 to 50 feet bgs, and the deep sample was collected. Boring logs from previous well installation activities at Site 90 were used to determine the depth of the confining unit across the site. The depth of each deep sample was determined based on the likely depth of the confining unit at that location after examining boring logs generated in the vicinity of each sample location. The deep aquifer samples were collected in the same manner as the shallow samples. All samples were submitted to an off-site laboratory for the analysis of TCL VOCs, with the results from the initial sample locations being returned within 24-hours of laboratory receipt.

Groundwater elevations were collected from 4 nearby permanent monitoring wells screened in the upper 25 feet of the surficial aquifer and from 5 monitoring wells screened in the lower portion of the surficial aquifer. The results of the water level survey are presented in **Table 1** and are shown on **Figures 4** and **5**.

SECTION 4

Summary of Results

Chlorinated VOCs as well as non-chlorinated VOCs, including petroleum related compounds such as BTEX, were detected in soils and groundwater at Site 90. The discussion in the following sections will focus on the CVOCs, as they are target contaminants in this investigation. Petroleum-related contamination will be discussed only briefly, as it is being addressed under the UST program at MCAS Cherry Point.

4.1 Groundwater

Groundwater sample results were screened against the following regulatory criteria:

- Federal Maximum Contaminant Levels (MCLs) and secondary guidelines (SMCLs);
- North Carolina 2L Groundwater Standards; and
- USEPA Region IX PRGs for tap water.

Groundwater VOC detections and exceedances are presented in **Table 2** and are shown on **Figure 6**.

4.1.1 Upper Surficial Aquifer Groundwater

Chlorinated VOCs were found to be present in the upper portion of the surficial aquifer (8 to 16 feet bgs) predominantly in the southern portion of the investigation area adjacent to Building 130. Ten CVOCs were detected in the upper portion of the surficial aquifer: 1,1-dichloroethane (1,1-DCA), 1,1-dichloroethene (1,1-DCE), 1,2-DCA, cis-1,2-DCE, trans-1,2-DCE, trichloroethene (TCE), chloroethane, chloromethane, methylene chloride, and vinyl chloride.

The highest concentrations of 1,1-DCA, 1,1-DCE, and vinyl chloride in the upper portion of the surficial aquifer were found at location 9003, located adjacent to the southeast wall of Building 130. Although higher concentrations of cis-1,2-DCE were found in deep samples, location 9003 had the highest concentration found in the shallow samples. 1,1-DCA and 1,1-DCE exceeded one or more screening criteria at location 9003. Vinyl chloride and cis-1,2-DCE exceeded all three screening criteria at location 9003.

The vinyl chloride concentration (850 µg/L) in the upper surficial aquifer sample at location 9003 was elevated significantly above other detected concentrations in both deep and shallow samples. The 850 µg/L result is more than two orders of magnitude greater than other detected concentrations and exceeds all screening criteria. Vinyl chloride also exceeded one or more screening criteria in shallow groundwater samples from six other locations adjacent to and downgradient of location 9003 and Building 130.

TCE was detected in two shallow samples, at locations 9002 and 9006. Both TCE detections in the upper surficial aquifer exceeded the USEPA Region IX tap water PRG.

Chloroethane, chloromethane, and methylene chloride exceeded one or more screening criteria in upper surficial aquifer groundwater samples. Chloroethane was detected in the vicinity of Building 130, specifically at locations 9001, 9003, and 9005. The greatest concentration of chloromethane in the upper surficial aquifer was detected in the sample from location 9002, which is located inside of Building 130. Methylene chloride was detected at one location, 9009, approximately 700 feet downgradient (northwest) of Building 130.

Non-chlorinated VOCs detected in the upper surficial aquifer that exceeded screening criteria included benzene, ethylbenzene, and total xylenes. Toluene was detected in upper surficial aquifer groundwater, but did not exceed any screening criteria.

4.1.1.1 Summary of Upper Surficial Aquifer Groundwater Investigation Results

The CVOCs detected in the upper surficial aquifer groundwater during the Phase I investigation are predominantly degradation products of TCE. Compounds indicative of progressively greater degradation, such as chlorethane, methylene chloride, and vinyl chloride, were detected in the upper surficial aquifer samples. The concentrations of compounds resulting from TCE degradation show a downgradient trend (higher concentrations of parent compounds upgradient to higher concentrations of daughter compounds downgradient) from the aircraft wash rack area to the north and northwest. The spatial distribution of CVOCs in the upper surficial aquifer groundwater found during the Phase I investigation are consistent with previous investigations that show elevated concentrations of CVOCs exceeding screening criteria in the vicinity of Building 130.

4.1.2 Lower Surficial Aquifer Groundwater

Eight of the ten CVOCs detected in the upper surficial aquifer were also detected in the lower surficial aquifer (36 to 50 feet bgs). 1,2-DCA and chloroethane were not detected in the samples from the lower surficial aquifer and no CVOCs were found that were not also detected in the upper portion of the aquifer.

TCE, cis-1,2-DCE, and 1,1-DCA were the most frequently detected CVOCs in the lower surficial aquifer. One or more groundwater screening criteria for TCE were exceeded in samples from 11 of the 27 sample locations. Cis-1,2-DCE exceeded one or more screening criteria at 4 locations. The highest concentrations of TCE (location 9017) and cis-1,2-DCE (location 9018) were found in the middle of the investigation area downgradient (north) of Building 130. The concentrations of these two compounds decrease moving downgradient to the north and northwest. The highest detected concentration of 1,1-DCA in lower surficial aquifer groundwater samples was found at location 9023 (at the downgradient extent of the Phase I study area), and concentrations decrease moving upgradient to the southeast.

1,1-DCE was detected in lower surficial aquifer groundwater samples at six locations, but did not exceed any screening criteria at these locations. 1,1-DCE was found from Building 130 extending north and west to the vicinity of sample location 9019.

Vinyl chloride was detected in lower surficial aquifer samples at 2 locations, 9017 and 9018. The concentrations in both samples exceeded all three groundwater screening criteria. Trans-1,2-DCE was detected in the lower surficial aquifer at six locations, but did not exceed any groundwater screening criteria.

Chloromethane and methylene chloride were detected in the lower surficial aquifer sample from location 9009. Only methylene chloride exceeded any groundwater screening criteria.

Benzene and ethylbenzene were detected above screening criteria in a number of lower surficial aquifer groundwater samples across the investigation area. Total xylenes were also detected in a number of samples, but did not exceed any screening criteria. Toluene was detected at one location, 9026, but did not exceed any screening criteria.

4.1.2.1 Summary of Lower Surficial Aquifer Groundwater Investigation Results

The CVOCs most frequently exceeding screening criteria in lower surficial aquifer groundwater samples were TCE and cis-1,2-DCE. The highest concentrations of CVOCs in the lower surficial aquifer were found north of Building 130. Concentrations of CVOCs exceeding screening criteria extend downgradient (northwest) from the washrack area to the approximate middle of the Phase I investigation area, where concentrations then begin to decrease. A number of CVOCs were not detected as far to the northwest as sample location 9009, but concentrations of these compounds increased significantly to levels exceeding screening criteria downgradient at the northwest extent of the Phase I investigation area. Cis-1,2-DCE exceeded all screening criteria and TCE exceeded the USEPA Region IX Tap Water PRG in the most downgradient Phase I samples. The distribution of CVOCs in the lower surficial aquifer indicates that the wash rack area may not be the only source area for CVOC contamination. The Phase I investigation results indicate that CVOC contamination is likely present downgradient of the Phase I investigation area. The downgradient concentrations and probable contamination beyond the Phase I investigation area may be due to other, localized sources rather than the wash rack area adjacent to Building 130.

4.1.3 Soil

Subsurface soil sample results were collected at 9 locations where PID readings were elevated during soil headspace screening. These data were screened against the following regulatory criteria:

- USEPA Region IX PRGs for industrial soils
- North Carolina Soil Revised Draft SSLs.

Subsurface soil analyte detections and exceedances are presented in **Table 3** and are shown on **Figure 7**.

Six CVOCs were detected in soils at Site 90, predominately to the north and northwest of Building 1701. 1,1,2,2-tetrachloroethane (1,1,2,2-PCA), 1,1,2-trichloroethane (1,1,2-TCA), 1,2-dibromo-3-chloropropane, and bromodichloromethane were detected at one location (9009), where concentrations of the four compounds exceeded both soil screening criteria. However, none of these CVOCs were detected in either the upper or lower surficial aquifer groundwater samples collected at this same location. Cis-1,2-DCE was detected in soil at one location (9025), and chloromethane was detected at four locations. Neither cis-1,2-DCE or chloromethane exceeded any screening criteria.

Thirteen non-chlorinated VOCs were detected in subsurface soils. Of these, 2-hexanone, 4-methyl-2-pentanone, methyl acetate, and styrene were detected at one location (9009), but

did not exceed screening criteria. In addition, cumene and methylcyclohexane were detected at more than one location, but did not exceed screening criteria. The maximum concentrations of the VOCs 2-butanone, acetone, benzene, cyclohexane, ethylbenzene, and total xylenes were also found at location 9009, and exceeded one or more screening criteria. The maximum concentration of toluene was detected at location 9026, but did not exceed any screening criteria.

4.1.3.1 Summary of Soil Sample Results

The compounds detected in the soil samples collected as part of the Phase I investigation do not appear to be related to the source of the CVOC contamination found in the underlying groundwater. The VOCs predominant in the soil samples were non-chlorinated VOCs commonly associated with petroleum products.

SECTION 5

UST Program CVOC Groundwater Data

Upon completion of the Phase I investigation, CVOC data recently collected as part of MCAS Cherry Point UST program groundwater monitoring efforts were made available to the IR Program. The groundwater data were collected in the vicinity of Buildings 1700, 130, 1701, 250, 4075, and approximately 500 feet to the northwest of Building 4075. The UST Program CVOC data are presented in **Tables 4** and **5**, which were provided by Catlin Engineers and Scientists. The UST Program sample locations and results are shown on **Figure 8**.

The data collected as part of the UST monitoring program indicate that CVOC contamination in the surficial aquifer extends northwest from Building 1700 to beyond Building 4075. The data points are infrequent over the approximately 3,000 foot long and 1,000 foot wide area, revealing a number of data gaps, but indicates that the CVOC contamination in the surficial aquifer extends considerably further downgradient to the northwest than the limits of the Phase I study area.

SECTION 6

Recommendations for Phase II RI Activities

After a review of the Phase I groundwater data presented in this report in conjunction with the CVOC groundwater data collected as part of the UST monitoring program, it is recommended that a comprehensive round of groundwater sampling be conducted utilizing existing monitoring wells located within Site 90 and extending downgradient along the flightline beyond Building 4075. The objective of the Phase II sampling round is to determine the extent of the CVOC plume in the surficial aquifer, which appears to extend considerably further downgradient than anticipated. Following the Phase II groundwater sampling, the complete data set from all investigations to date will be evaluated to determine if any data gaps remain. If necessary, a focused Phase III investigation will be conducted to clear up any remaining data gaps.

The proposed Phase II study area and sampling locations are shown in **Figure 9**. The proposed existing monitoring wells to be sampled (57 monitoring wells) consist of wells screened in the upper and lower portions of the surficial aquifer. Samples will be analyzed for TCL VOCs, RCRA-8 metals, nitrate, and sulfate, and will be collected in accordance with the Final Remedial Investigation Work Plan for OU14, Site 90 (CH2M HILL, August 2002).

SECTION 7

References

CH2M HILL, Inc. (August 2002), *Final Remedial Investigation Work Plan for Operable Unit 14, Site 90, Marine Corps Air Station, Cherry Point, North Carolina*, Contract No. N62470-95-D-6007, Contract Task Order 0209.

Law Engineering (June 1995), *Leaking Underground Pipeline Site Assessment Report, Building 130, Marine Corps Air Station, Cherry Point, North Carolina*, Contract No. N62470-93-D-4020.

Table 1
Groundwater Elevation Measurements, October 2002
Phase I Remedial Investigation
OU14, Site 90
MCAS Cherry Point

Monitoring Well Identification	TOP OF PVC CASING ELEVATION (FEET AMSL)	DEPTH TO WATER (FEET)	GROUNDWATER ELEVATION (FEET AMSL)
SHALLOW (Upper Surficial Aquifer)			
72GW03	27.63	10.00	17.63
OU1-MW70	22.52	8.93	13.59
OU1-MW68	24.33	10.30	14.03
OU1-MW61	26.85	7.10	19.75
DEEP (Lower Surficial Aquifer)			
72GW16	27.53	11.49	16.04
OU1-MW72	22.66	10.01	12.65
OU1-MW71	22.50	8.74	13.76
OU1-MW69	24.43	10.30	14.13
OU1-MW62	26.83	11.90	14.93

Table 2
Groundwater VOC Detects and Exceedances
Phase I Remedial Investigation
OU14, Site 90
MCAS Cherry Point

Station ID	MCL-Groundwater (1)	NC-GW-Screening (2)	Region IX PRGs - Tap Water (3)	9001GW		9002GW		9003GW		9004GW		9005GW	9006GW		9007GW		9008GW		9009GW		9010GW	
Sample ID				9001GW1216	9001GW3640	9002GW1216	9002GW3640	9003GW1216	9003GW3640	9004GW1216	9004GW4044	9005GW1216	9006GW1216	9006GW4044	9007GW1216	9007GW4044	9008GW0812	9008GW4448	9009GW0812	9009GW4448	9010GW1216	9010GW4448
Chemical Name																						
Volatile Organic Compounds (ug/L																						
1,1-Dichloroethane	--	700	810	**51**	**10**	**3.9**	**8**	**720** (2)	**5.2**	**10**	1 U	**7.6**	1 U	**9**	1 U	**15**	1 U	**1.2**	25 U	25 U	1 U	**30**
1,1-Dichloroethene	**7**	**7**	340	**0.67 J**	5 U	1 U	**2.2**	**38** (1,2)	5 U	1 U	1 U	1 U	1 U	**0.7 J**	1 U	1 U	1 U	1 U	25 U	25 U	1 U	1 U
1,2-Dichloroethane	**5**	**0.38**	**0.12**	1 U	5 U	1 U	1 U	**4** (2,3)	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	25 U	25 U	1 U	1 U
2-Hexanone	--	280	--	5 U	25 U	5 U	5 U	**4.6 J**	25 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	130 U	130 U	5 U	5 U
Acetone	--	700	610	5 U	25 U	5 U	**12**	5 U	25 U	5 U	5 U	5 U	5 U	5 U	5 U	**4.1 J**	5 U	130 U	130 U	130 U	5 U	5 U
Benzene	**5**	**1**	**0.34**	**3.1** (2,3)	**150** (1,2,3)	**1.4** (2,3)	1 U	**9.4** (1,2,3)	**9.2** (1,2,3)	**0.76 J** (3)	1 U	**600** (1,2,3)	1 U	**11** (1,2,3)	1 U	**250** (1,2,3)	**16** (1,2,3)	**16** (1,2,3)	**210** (1,2,3)	**25 J** (1,2,3)	1 U	**2.5** (2,3)
Carbon disulfide	--	700	1,000	1 U	5 U	3.1 U	1 U	**1.3**	5 U	**1.1**	**0.96 J**	1 U	1 U	1 U	1.5 U	1 U	2.6 U	1.3 U	**20 J**	**88**	1 U	1 U
Chloroethane	--	2,800	**4.6**	**6.9** (3)	5 U	1 U	1 U	**47** (3)	5 U	1 U	1 U	**9.1** (3)	1 U	1 U	1 U	1 U	1 U	1 U	25 U	25 U	1 U	1 U
Chloromethane	--	**2.6**	**1.5**	1 U	5 U	**2.6** (2,3)	1 U	1 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	25 U	**21 J** (2,3)	1 U	1 U
cis-1,2-Dichloroethene	**70**	**70**	**61**	**5.9**	5 U	**6.4**	1 U	**150** (1,2,3)	5 U	**1.8**	**7.2**	1 U	**0.54 J**	**3.9**	1 U	**1.3**	1 U	**35**	25 U	**57**	1 U	**8.8**
Ethylbenzene	700	**29**	**2.9**	1 U	**140** (2,3)	1 U	1 U	**2.3**	**130** (2,3)	1 U	1 U	**66** (2,3)	1 U	1 U	1 U	**1.9**	**12** (3)	**1**	**160** (2,3)	**30** (2,3)	1 U	1 U
Methylene chloride	**5**	**5**	**4.3**	1.5 U	14 U	1.3 U	1.5 U	2 U	14 U	1.2 U	1.3 U	2 U	1 U	2.5 U	1 U	1 U	1 U	1 U	**36** (1,2,3)	**37** (1,2,3)	2.1 U	2.3 U
Styrene	100	100	1,600	1 U	5 U	1 U	1 U	1 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	25 U	25 U	1 U	1 U
Toluene	1,000	1,000	720	1 U	5 U	1 U	1 U	**5.3**	5 U	1 U	1 U	**7.7**	1 U	1 U	1 U	1 U	1 U	1 U	25 U	25 U	1 U	1 U
trans-1,2-Dichloroethene	100	70	120	1 U	5 U	1 U	1 U	**3.2**	5 U	1 U	**0.7 J**	1 U	1 U	1 U	1 U	1 U	1 U	**7.5**	25 U	25 U	1 U	1 U
Trichloroethene	**5**	**2.8**	**0.028**	1 U	5 U	**0.55 J** (3)	**0.67 J** (3)	1 U	5 U	1 U	**24** (1,2,3)	1 U	**0.64 J** (3)	**1.2** (3)	1 U	1 U	1 U	1 U	25 U	25 U	1 U	1 U
Vinyl chloride	**2**	**0.015**	**0.02**	**28** (1,2,3)	5 U	1 U	1 U	**850** (1,2,3)	5 U	**1.9** (2,3)	1 U	**1.6** (2,3)	1 U	1 U	1 U	1 U	**0.56 J** (2,3)	1 U	25 U	25 U	1 U	1 U
Xylene, total	10,000	**530**	**210**	1 U	5 U	1 U	1 U	**17**	5 U	1 U	1 U	**980** (2,3)	1 U	1 U	1 U	**2.4**	**12**	**2**	**250** (3)	**77**	1 U	1 U

Station ID	MCL-Groundwater (1)	NC-GW-Screening (2)	Region IX PRGs - Tap Water (3)	9011GW		9012GW		9013GW		9014GW		9015GW		9016GW		9017GW		9018GW		9019GW	
Sample ID				9011GW1216	9011GW4448	9012GW1216	9012GW4650	9013GW1216	9013GW4650	9014GW1216	9014GW4050	9015GW1216	9015GW4650	9016GW1216	9016GW4448	9017GW1216	9017GW4448	9018GW1216	9018GW4650	9019GW1216	9019GW4650
Chemical Name																					
Volatile Organic Compounds (ug/L)																					
1,1-Dichloroethane	--	**700**	810	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	**3.1**	1 U	**18**	**6.4**	**52**
1,1-Dichloroethene	**7**	**7**	340	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	**1.3**	1 U	**2.2**	1 U	**2.2**
1,2-Dichloroethane	**5**	**0.38**	**0.12**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
2-Hexanone	--	280	--	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Acetone	--	700	610	5 U	5 U	5 U	5 U	5 U	5 U	5 U	**3.1 J**	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Benzene	**5**	**1**	**0.34**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	**9** (1,2,3)	1 U	**3.7** (2,3)	1 U	**0.56 J** (3)	**4** (2,3)	1 U	**2.3** (2,3)	1 U	**2.5** (2,3)
Carbon disulfide	--	700	1,000	**3.8**	2.3 U	1 U	**2**	1 U	1.3 U	1 U	1.6 U	2.9 U	2.8 U	**0.7 J**	**3.1**	**1.5**	**5.1**	1 U	**3.3**	1 U	**1.4**
Chloroethane	--	2,800	**4.6**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloromethane	--	**2.6**	**1.5**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	**1.4**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	**70**	**70**	**61**	1 U	**1.8**	1 U	1 U	1 U	1 U	1 U	1 U	**42**	1 U	**9.3**	1 U	**43**	**130** (1,2,3)	1 U	**300** (1,2,3)	**2.7**	**54**
Ethylbenzene	700	**29**	**2.9**	**0.51 J**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	**4.6** (3)	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methylene chloride	**5**	**5**	**4.3**	1 U	1 U	1.2 U	1.1 U	1 U	1 U	1 U	1 U	1 U	1 U	1.6 U	1.6 U	2.5 U	1.3 U	1.5 U	1.2 U	1.2 U	1.2 U
Styrene	100	100	1,600	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Toluene	1,000	1,000	720	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
trans-1,2-Dichloroethene	100	70	120	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	**1.8**	1 U	1 U	1 U	**3.3**	**16**	1 U	**33**	1 U	**3.1**
Trichloroethene	**5**	**2.8**	**0.028**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	**69** (1,2,3)	1 U	**16** (1,2,3)	1 U	**12** (1,2,3)
Vinyl chloride	**2**	**0.015**	**0.02**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	**0.7 J** (2,3)	1 U	**1.6** (2,3)	**2.7** (1,2,3)	1 U	**2.4** (1,2,3)	1 U	1 U
Xylene, total	10,000	**530**	**210**	**0.64 J**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U

Station ID	MCL-Groundwater (1)	NC-GW-Screening (2)	Region IX PRGs - Tap Water (3)	9020GW		9021GW		9022GW		9023GW		9024GW		9025GW		9026GW		9027GW	
Sample ID				9020GW1216	9020GW3640	9021GW1216	9021GW4044	9022GW1216	9022GW4650	9023GW1216	9023GW4448	9024GW1216	9024GW4650	9025GW1216	9025GW4044	9026GW1216	9026GW4448	9027GW1216	9027GW4448
Chemical Name																			
Volatile Organic Compounds (ug/L)																			
1,1-Dichloroethane	--	**700**	810	**28**	**11**	1 U	**0.99 J**	1 U	1 U	1 U	**75**	1 U	1 U	1 U	1 U	1 U	**1.9**	1 U	1 U
1,1-Dichloroethene	**7**	**7**	340	1 U	**5.5**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloroethane	**5**	**0.38**	**0.12**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	**28** (1,2,3)	1 U	1 U	1 U
2-Hexanone	--	280	--	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Acetone	--	700	610	5 U	5 U	5 U	**10**	5 U	5 U	5 U	**6.8**	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Benzene	**5**	**1**	**0.34**	**1,000** (1,2,3)	**1,500** (1,2,3)	**140** (1,2,3	**58** (1,2,3)	1 U	**1.9** (2,3)	**73** (1,2,3)	**27** (1,2,3)	**440** (1,2,3)	**19** (1,2,3)	**210** (1,2,3)	**290** (1,2,3)	**1,100** (1,2,3)	**19** (1,2,3)	**150** (1,2,3)	**170** (1,2,3)
Carbon disulfide	--	700	1,000	**0.88 J**	**2.7**	1 U	**1.9**	**16**	**6.7**	1 U	1.2 U	1 U	1 U	1 U	1 U	**1.1**	1 U	1 U	1 U
Chloroethane	--	2,800	**4.6**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloromethane	--	**2.6**	**1.5**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	**70**	**70**	**61**	1 U	1 U	1 U	1 U	**0.77 J**	**32**	**0.66 J**	**170** (1,2,3)	1 U	**90** (1,2,3)	**1.5**	**7.1**	**1.2**	**6.8**	1 U	**12**
Ethylbenzene	700	**29**	**2.9**	**160** (2,3)	**97** (2,3)	1 U	**0.73 J**	1 U	1 U	**43** (2,3)	1 U	**25** (3)	**8.8** (3)	**11** (3)	**4** (3)	**120** (2,3)	**69** (2,3)	**170** (2,3)	**32** (2,3)
Methylene chloride	**5**	**5**	**4.3**	1.9 U	1.2 U	1 U	1.2 U	1.3 U	1.3 U	3.3 U	2.7 U	2.8 U	3 U	3.1 U	3.7 U	2.3 U	2.7 U	2 U	2.7 U
Styrene	100	100	1,600	1 U	1 U	1 U	1 U	1 U	1 U	**0.87 J**	1 U	1 U	1 U	1 U	1 U	**2.5**	**1.3**	1 U	1 U
Toluene	1,000	1,000	720	**39**	3 U	**8.5**	1.1 U	1 U	1 U	**8.3**	1 U	1 U	1 U	1.1 U	1 U	**18**	**12**	1 U	1 U
trans-1,2-Dichloroethene	100	70	120	1 U	1 U	1 U	1 U	1 U	**4.1**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Trichloroethene	**5**	**2.8**	**0.028**	1 U	1 U	1 U	1 U	1 U	**20** (1,2,3)	1 U	**0.65 J** (3)	1 U	**1.1** (3)	1 U	**2.5** (3)	1 U	**3** (2,3)	1 U	1 U
Vinyl chloride	**2**	**0.015**	**0.02**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Xylene, total	10,000	**530**	**210**	**1,800** (2,3)	**38**	**190**	**1.1**	1 U	1 U	**97**	**0.54 J**	**120**	**23**	**1.5**	**5.9**	**660** (2,3)	**170**	**16**	**15**

Notes:

1.Sample ID scheme example:
- 9001 - Site 90, location 01
- GW - groundwater sample
- 1216 - sample collected from the 12 - 16 foot bgs interval

2. Detections of a chemical are indicated by bold font.

3. Detections that exceed one or more screening criteria are indicated by bold red font.

4. Screening criteria exceeded at least once are also indicated by bold red font.

5. Each screening criteria has been assigned a reference number listed in parentheses in the column header.

6.The reference number is used to identify specific criteria exceeded in a particular sample.

7.Data entries consist of the concentration followed by the data qualifier (if any) followed by the reference number(s).

8. U - compound not detected

9. J - reported value is estimated

10. "--" - no screening criteria available

Table 3
Soil VOC Detects and Exceedances
Phase I Remedial Investigation
OU14, Site 90
MCAS Cherry Point

Station ID / Sample ID / Sample Date	NC-Revised Draft SSLs (1)	Region IX PRGs - Industrial Soil (2)	9006SB0203	9007SB0607	9008SB0203	9009SB0708	9021SB0506*	9024SB0203	9025SB1011	9026SB0607	9027SB0607
Chemical Name											
Volatile Organic Compounds (ug/Kg)											
1,1,2,2-Tetrachloroethane	**0.953**	**930**	4.6 U	4.7 U	4.9 U	**3,200 J (1,2)**	5 U	4.9 U	7.3 U	5.5 UJ	6.1 U
1,1,2-Trichloroethane	**3.34**	**1,600**	4.6 U	4.7 U	4.9 U	**2,500 J (1,2)**	5 U	4.9 U	7.3 U	5.5 UJ	6.1 U
1,2-Dibromo-3-chloropropane	**0.15**	**2,000**	4.6 U	4.7 U	4.9 U	**3,900 J (1,2)**	5 U	4.9 U	7.3 U	5.5 UJ	6.1 U
2-Butanone	**692**	27,000,000	**8.5 J**	9.5 U	**10**	**5,800 J (1)**	10 U	9.8 U	15 U	11 UJ	12 U
2-Hexanone	--	--	9.2 U	9.5 U	9.8 U	**19,000**	10 U	9.8 U	15 U	11 UJ	12 U
4-Methyl-2-pentanone	--	2,800,000	9.2 U	9.5 U	9.8 U	**53,000**	10 U	9.8 U	15 U	11 UJ	12 U
Acetone	**2,810**	6,000,000	**48**	9.5 U	**51**	**25,000 (1)**	12 U	**49**	15 U	**72 J**	**34 J**
Benzene	**5.62**	**1,300**	4.6 U	4.7 U	4.9 U	**8,000 (1,2)**	5 U	**5.1**	**210 (1)**	**43 J (1)**	6.1 U
Bromodichloromethane	**3.13**	**1,800**	4.6 U	4.7 U	4.9 U	**3,200 J (1,2)**	5 U	4.9 U	7.3 U	5.5 UJ	6.1 U
Chloromethane	--	2,600	9.2 U	9.5 U	9.8 U	12,000 U	**3.6 J**	**4.7 J**	**7.7 J**	**8.5 J**	12 U
Cumene	--	2,000,000	4.6 U	4.7 U	4.9 U	**8,400**	5 U	**190**	**32**	**550 J**	**200 J**
Cyclohexane	**--**	**140,000**	4.6 U	4.7 U	**11**	**520,000 (2)**	**83 J**	**260 J**	7.3 U	**520 J**	6.1 U
Ethylbenzene	**241**	**20,000**	4.6 U	4.7 U	**1.9 J**	**56,000 (1,2)**	5 U	**520 J (1)**	**300 J (1)**	**1,800 J (1)**	**1,600 J (1)**
Methyl acetate	--	92,000,000	4.6 U	4.7 U	4.9 U	**800,000**	5 U	4.9 U	7.3 U	5.5 UJ	6.1 U
Methylcyclohexane	--	8,700,000	4.6 U	4.7 U	**21**	**46,000**	**58 J**	**1,700 J**	**900 J**	**2,000 J**	6.1 U
Styrene	2,240	1,700,000	4.6 U	4.7 U	4.9 U	6,200 U	5 U	4.9 U	7.3 U	**36 J**	6.1 U
Toluene	7,270	520,000	4.6 U	4.7 U	4.9 U	6,200 U	5 U	4.9 U	**8.1**	**560 J**	**4.5 J**
Xylene, total	**4,960**	420,000	**2 J**	**4.6 J**	**6.1**	**160,000 (1)**	**3.9 J**	**610 J**	**160**	**1,900 J**	**1,400 J**
cis-1,2-Dichloroethene	350	150,000	4.6 U	4.7 U	4.9 U	6,200 U	5 U	4.9 U	**7.2 J**	5.5 UJ	6.1 U

Notes:
* - Duplicate sample collected at this location
Sample ID scheme example:
9006 - Site 90, location 06
SB - subsurface soil sample
0203 - sample collected from the 2-3 foot bgs interval
Detections of a chemical are indicated by bold font.
Detections that exceed one or more screening criteria are indicated by bold red font.
Screening criteria exceeded at least once are also indicated by bold red font.
Each screening criteria has been assigned a reference number listed in parentheses in the column header.
The reference number is used to identify specific criteria exceeded in a particular sample.
Data entries consist of the concentration followed by the data qualifier (if any) followed by the reference number(s).
U - compound not detected
J - reported value is estimated
"--" - no screening criteria available

TABLE 4

SITE 130

GROUND WATER LABORATORY ANALYTICAL RESULTS

EPA 601

Date Sampled: 2/11/02

PARAMETER	2L	GCL	UNITS	72GW10	72GW23	72GW27	72GW28	72GW28DUP	72GW29	74GW15
"1,1,1-Trichloroethane"	200.0000	0.0000	ug/L	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1,1,2,2-Tetrachloroethane"	0.1700	170.0000	ug/L	0.00	0.00	0.00	0.00	0.00	0.00	0.00
"1,1,2-Trichloroethane"	0.0000	0.0000	ug/L	0.00	0.00	0.00	0.00	0.00	0.00	0.00
"1,1-Dichloroethane"	700.0000	700,000.0000	ug/L	0.00	0.00	45.00	3.40	3.90	4.80	0.00
"1,1-Dichloroethene"	7.0000	7,000.0000	ug/L	0.00	0.00	0.00	0.00	0.00	0.00	0.00
"1,2-Dichlorobenzene"	620.0000	72,500.0000	ug/L	0.00	0.00	0.00	0.00	0.00	0.00	0.00
"1,2-Dichloroethane"	0.3800	380.0000	ug/L	0.00	0.00	0.00	0.00	0.00	0.00	0.00
"1,2-Dichloropropane"	0.5600	560.0000	ug/L	0.00	0.00	0.00	0.00	0.00	0.00	0.00
"1,3-Dichlorobenzene"	620.0000	61,500.0000	ug/L	0.00	0.00	0.00	0.00	0.00	0.00	0.00
"1,4-Dichlorobenzene"	75.0000	39,500.0000	ug/L	0.00	0.00	0.00	0.00	0.00	0.00	0.00
"cis-1,2-Dichloroethene"	70.0000	70,000.0000	ug/L	17.00	5.50	2.50	1.30	1.50	5.10	0.00
"cis-1,3-Dichloropropene"	0.2000	200.0000	ug/L	0.00	0.00	0.00	0.00	0.00	0.00	0.00
"trans-1,2-Dichloroethene"	70.0000	70,000.0000	ug/L	0.00	0.00	0.00	0.00	0.00	0.00	0.00
trans-1,3-Dichloropropene"	0.2000	200.0000	ug/L	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bromodichloromethane	0.6000	0.0000	ug/L	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bromoform	0.1900	0.0000	ug/L	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bromomethane	0.0000	0.0000	ug/L	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Carbon tetrachloride	0.3000	0.0000	ug/L	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Chlorobenzene	50.0000	0.0000	ug/L	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Chloroethane	2,800.0000	0.0000	ug/L	0.00	3.60	0.00	0.00	0.00	0.00	0.00
Chloroform	0.1900	0.0000	ug/L	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Chloromethane	2.6000	2,600.0000	ug/L	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dibromochloromethane	0.4100	0.0000	ug/L	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EDB	0.0004	50.0000	ug/L	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Methylene Chloride	5.0000	5,000.0000	ug/L	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tetrachloroethene	0.7000	700.0000	ug/L	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Trichloroethene	2.8000	0.0000	ug/L	0.00	3.90	0.00	0.00	0.00	0.00	0.00
Trichlorofluoromethane	2,100.0000	0.0000	ug/L	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vinyl Chloride	0.0100	0.0000	ug/L	0.00	0.00	0.00	1.50	1.80	0.00	0.00
Totals:				**17.00**	**13.00**	**47.50**	**6.20**	**7.20**	**9.90**	**0.00**

Notes:
1. 2L = North Carolina groundwater quality standard 15A NCAC 2L .0202
2. GCL = Gross Contamination Levels for ground water as defined in "Groundwater Section Guidelines for the Investigation and Remediation of Soil and Groundwater" Volume II January, 1998
3. ug/L = Micrograms per Liter
4. A zero ("0.00") in the results column indicates concentration is either below detection limit or below quantitation
5. A zero ("0.0000") in the 2L column indicates the 2L standard is equal to the laboratory detection limit
6. A zero ("0.0000") jn the GCL column indicates a GCL has not been established

Source: Catlin Engineers and Scientists.

TABLE 5

SITE 4075

GROUND WATER LABORATORY ANALYTICAL RESULTS

EPA 601

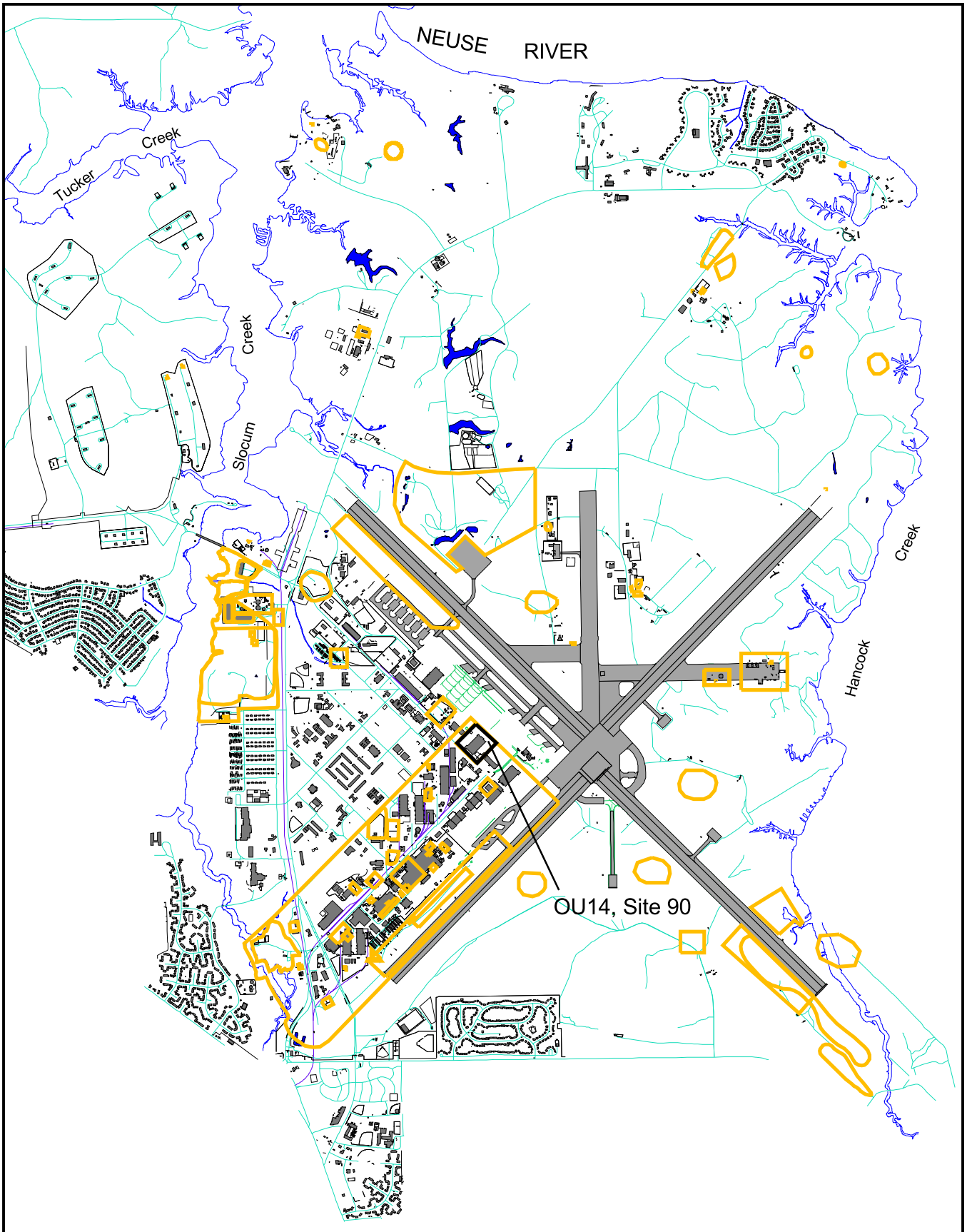
Date Sampled: 2/6/02

PARAMETER	2L	GCL	UNITS	13GW11	13GW12	13GW142	13GW142DUP	13GW17	13GW29	66GW02	66GW08	66GW09	66GW04	66GW20	66GW35
"1,1,1-Trichloroethane"	200.0000	0.0000	ug/L	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1,1,2,2-Tetrachloroethane"	0.1700	170.0000	ug/L	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
"1,1,2-Trichloroethane"	0.0000	0.0000	ug/L	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
"1,1-Dichloroethane"	700.0000	700,000.0000	ug/L	21.00	12.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.00	0.00	0.00
"1,1-Dichloroethene"	7.0000	7,000.0000	ug/L	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
"1,2-Dichlorobenzene"	620.0000	72,500.0000	ug/L	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
"1,2-Dichloroethane"	0.3800	380.0000	ug/L	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
"1,2-Dichloropropane"	0.5600	560.0000	ug/L	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
"1,3-Dichlorobenzene"	620.0000	61,500.0000	ug/L	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
"1,4-Dichlorobenzene"	75.0000	39,500.0000	ug/L	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
"cis-1,2-Dichloroethene"	70.0000	70,000.0000	ug/L	200.00	6.00	450.00	420.00	2.00	33.00	5.00	25.00	8.00	11.00	0.00	4.00
"cis-1,3-Dichloropropene"	0.2000	200.0000	ug/L	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
"trans-1,2-Dichloroethene"	70.0000	70,000.0000	ug/L	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
trans-1,3-Dichloropropene"	0.2000	200.0000	ug/L	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bromodichloromethane	0.6000	0.0000	ug/L	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bromoform	0.1900	0.0000	ug/L	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bromomethane	0.0000	0.0000	ug/L	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Carbon tetrachloride	0.3000	0.0000	ug/L	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Chlorobenzene	50.0000	0.0000	ug/L	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Chloroethane	2,800.0000	0.0000	ug/L	0.00	3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Chloroform	0.1900	0.0000	ug/L	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Chloromethane	2.6000	2,600.0000	ug/L	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dibromochloromethane	0.4100	0.0000	ug/L	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EDB	0.0004	50.0000	ug/L	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Methylene Chloride	5.0000	5,000.0000	ug/L	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tetrachloroethene	0.7000	700.0000	ug/L	0.00	0.00	230.00	210.00	0.00	0.00	0.00	4.00	0.00	0.00	0.00	0.00
Trichloroethene	2.8000	0.0000	ug/L	0.00	0.00	140.00	130.00	0.00	0.00	110.00	1.00	140.00	0.00	0.00	2.00
Trichlorofluoromethane	2,100.0000	0.0000	ug/L	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vinyl Chloride	0.0100	0.0000	ug/L	0.00	0.00	100.00	94.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Totals:				**221.00**	**21.00**	**920.00**	**854.00**	**2.00**	**33.00**	**115.00**	**30.00**	**148.00**	**13.00**	**0.00**	**6.00**

Notes:
1. 2L = North Carolina groundwater quality standard 15A NCAC 2L .0202
2. GCL = Gross Contamination Levels for ground water as defined in "Groundwater Section Guidelines for the Investigation and Remediation of Soil and Groundwater" Volume II January, 1998
3. ug/L = Micrograms per Liter
4. A zero ("0.00") in the results column indicates concentration is either below detection limit or below quantitation
5. A zero ("0.0000") in the 2L column indicates the 2L standard is equal to the laboratory detection limit
6. A zero ("0.0000") jn the GCL column indicates a GCL has not been established

Source: Catlin Engineers and Scientists.

File Path: v:\18gis\mcas_cherrypoint\ou14_site90.apr



LEGEND
- Site Boundary
- Runway
- Buildings

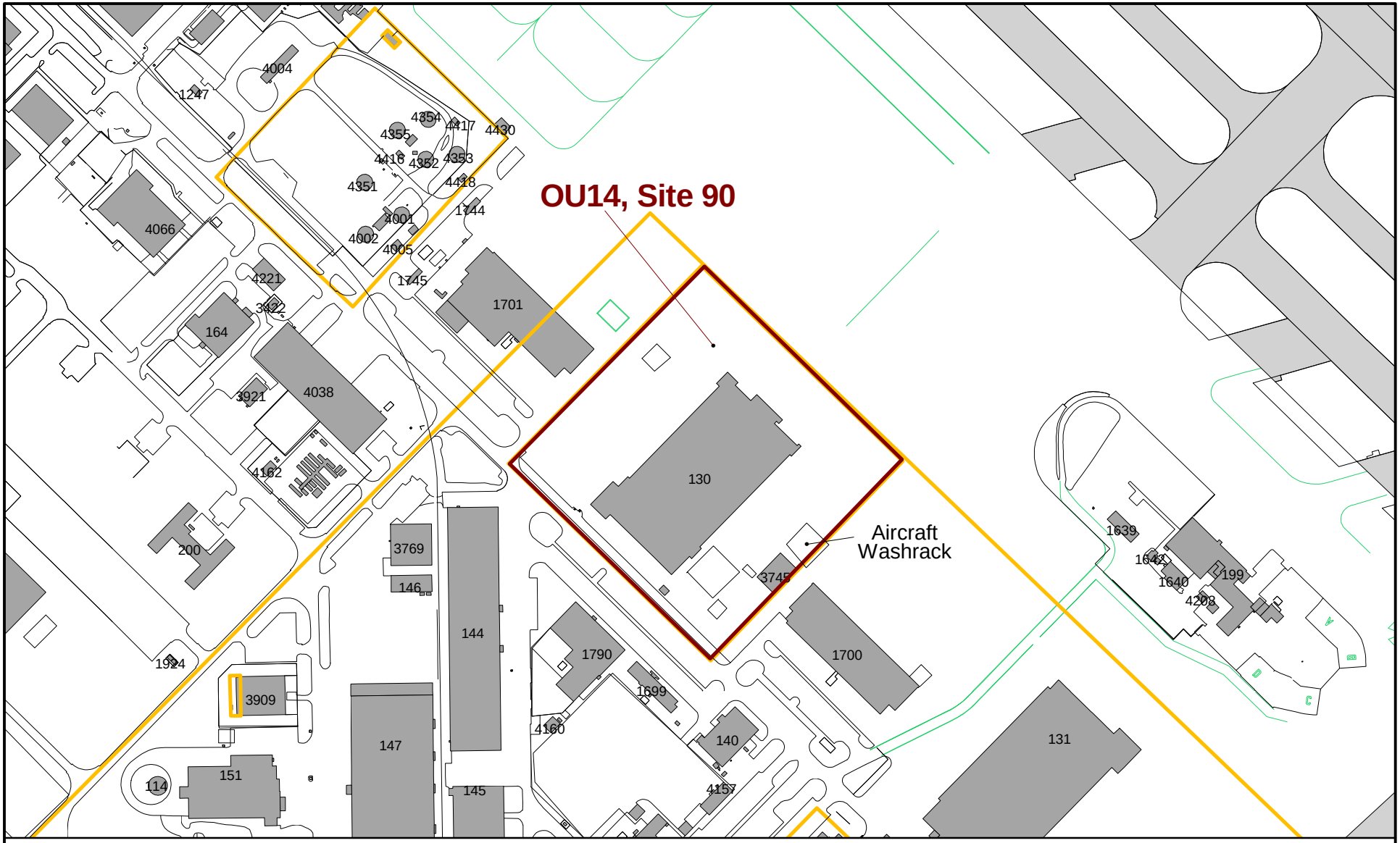
N

2000 0 2000 4000 Feet

Figure 1
Vicinity Map
OU14, Site 90
MCAS Cherry Point

CH2MHILL

File Path: V:\18gis\MCAS_CherryPoint\ou14_site90.apr



LEGEND

- Site Boundary
- MCAS Sites
- Buildings & Structures
- Airfield Pavement

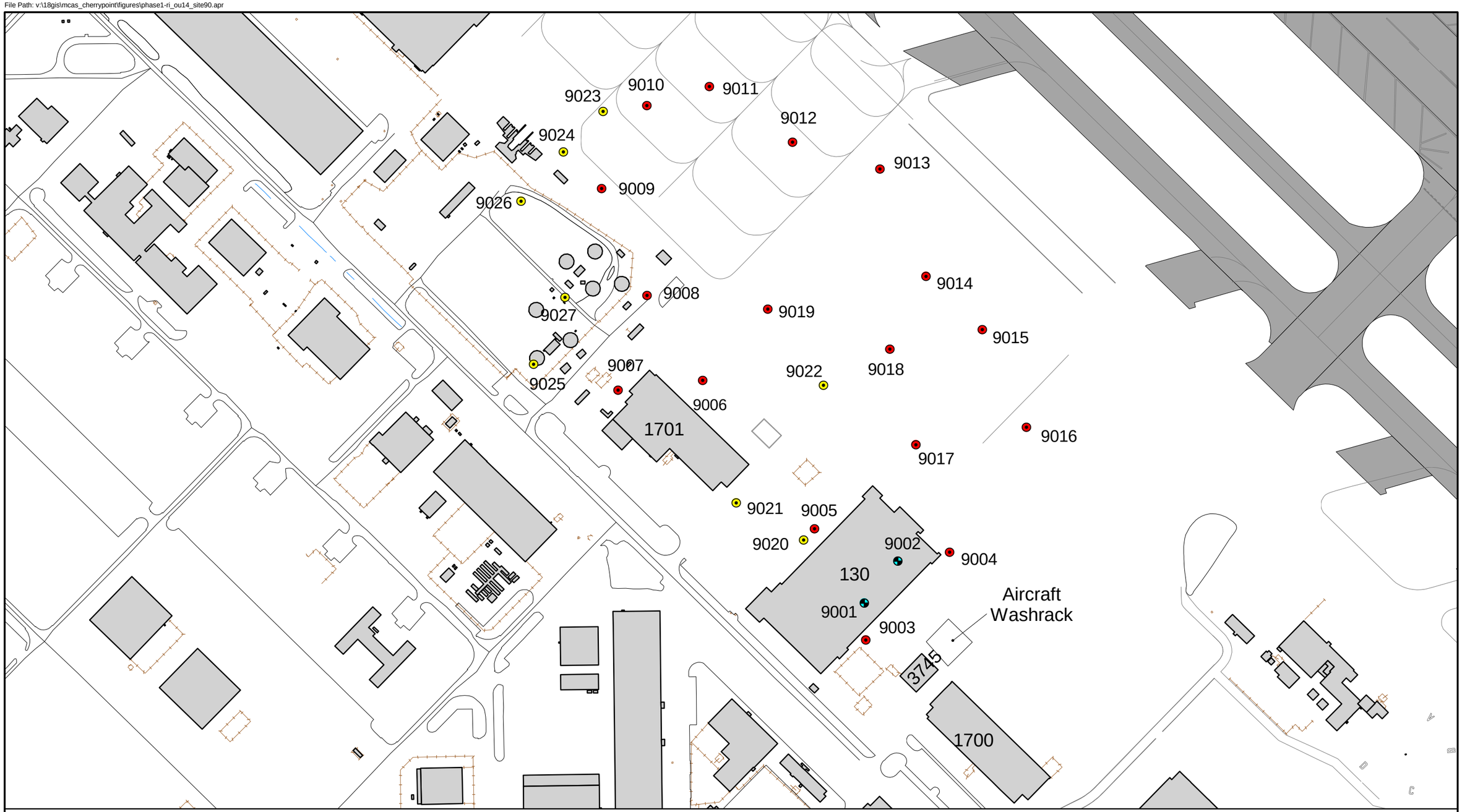
N

0 200 400 Feet

Figure 2
Site Map
OU14, Site 90
MCAS Cherry Point

CH2MHILL

File Path: v:\18gis\mcas_cherrypoint\figures\phase1-ri_ou14_site90.apr



LEGEND

- Initial Phase I Investigation Locations
- Additional Phase I Investigation Locations

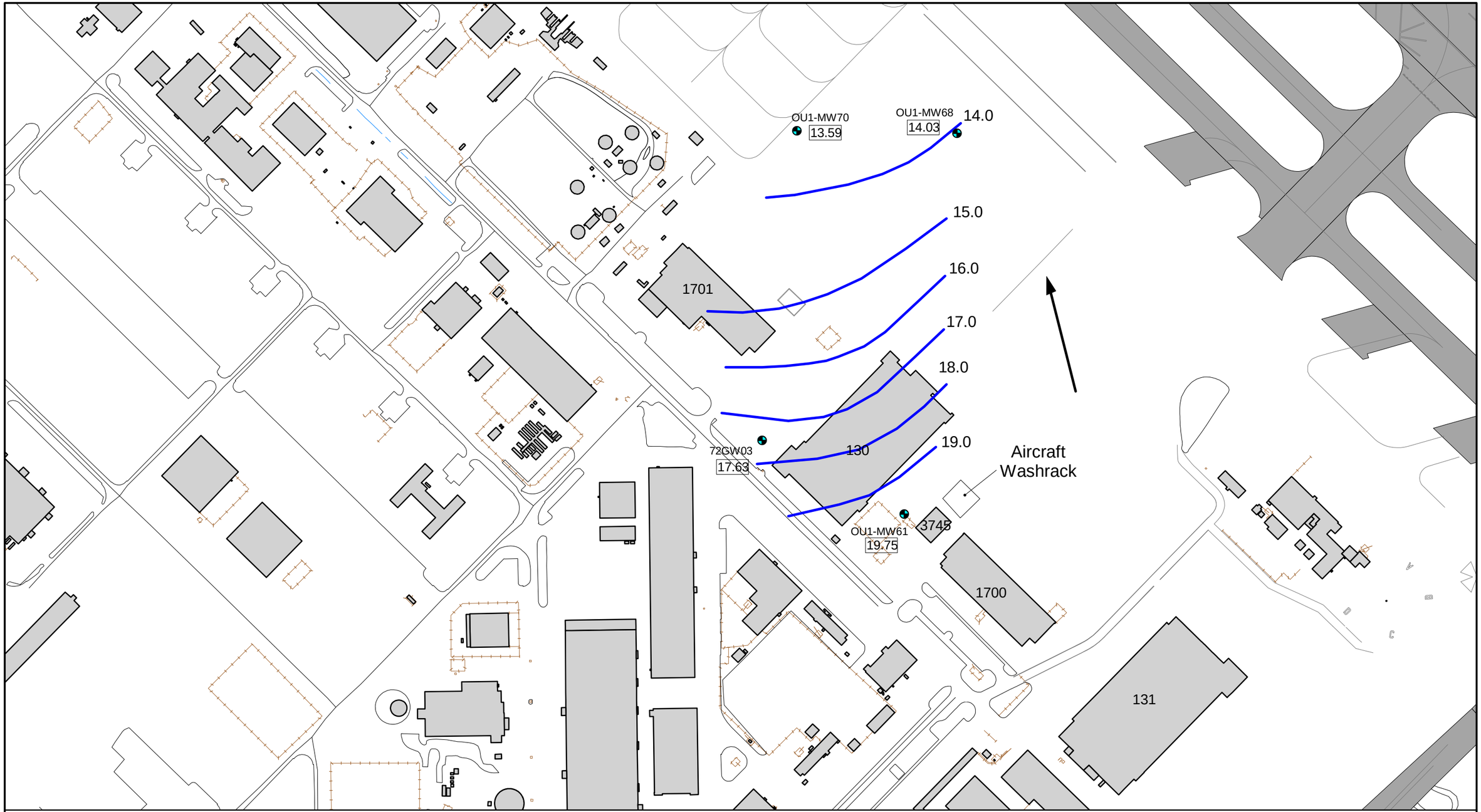
N

0 200 400 Feet

Figure 3
Phase I Investigation Locations
OU14, Site 90
MCAS Cherry Point

CH2MHILL

File Path: v:\18gis\mcas_cherrypoint\figures\phase1-ri_ou14_site90.apr



LEGEND

- Monitoring Well
- 13.59 Monitoring Well Location With Potentiometric Surface Elevation
- Potentiometric Surface Elevation Contour
- Groundwater Flow Direction

14.0 - Groundwater Elevations in Feet Above Mean Sea Level

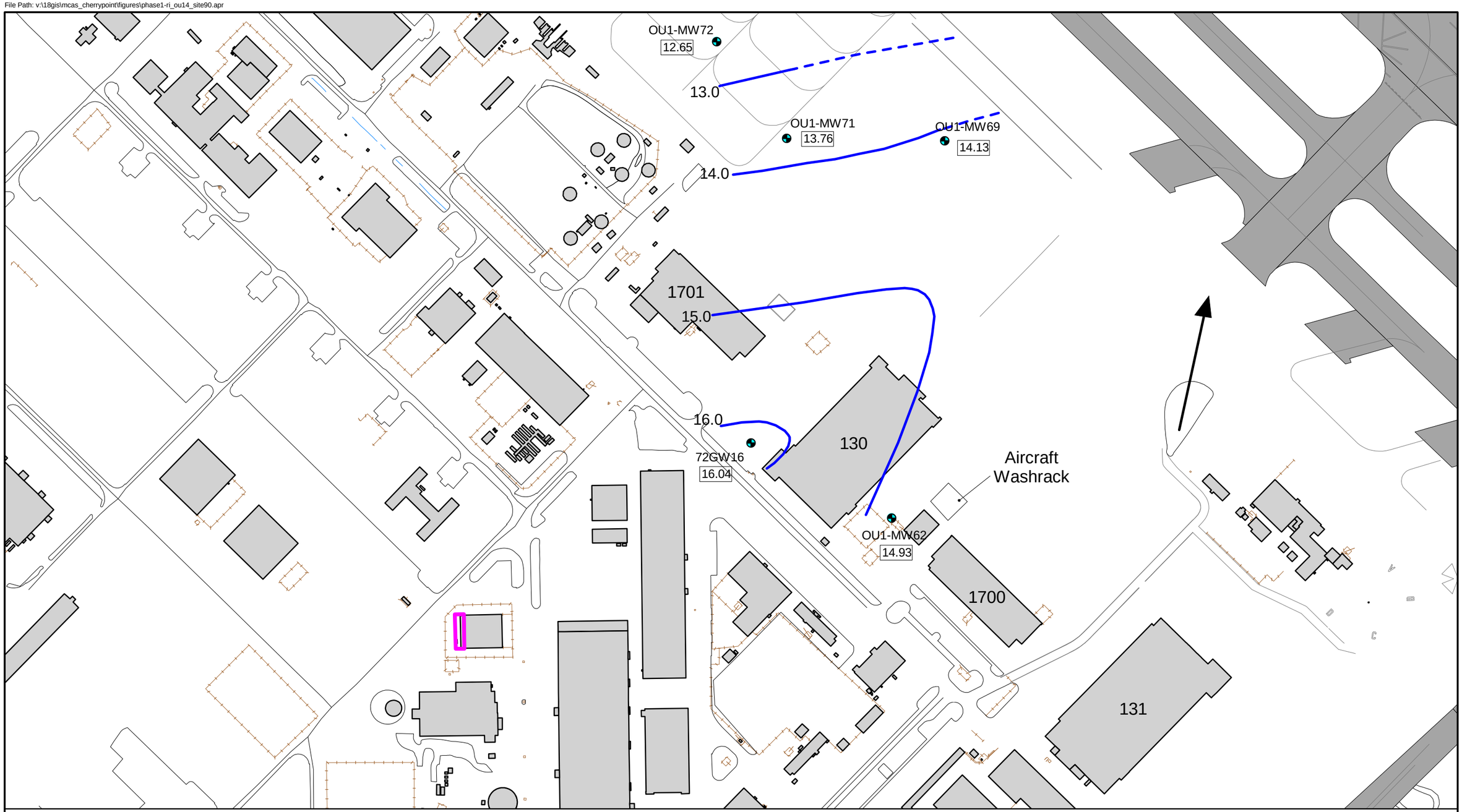
N

0 200 400 Feet

Figure 4
Potentiometric Surface Map -
Upper Surficial Aquifer, October 2002
OU14, Site 90
MCAS Cherry Point

CH2MHILL

File Path: v:\18gis\mcas_cherrypoint\figures\phase1-ri_ou14_site90.apr



LEGEND

- Monitoring Well
- 12.65 Monitoring Well Location With Potentiometric Surface Elevation
- Potentiometric Surface Elevation Contour
- Groundwater Flow Direction

13.0 - Groundwater Elevations in Feet Above Mean Sea Level

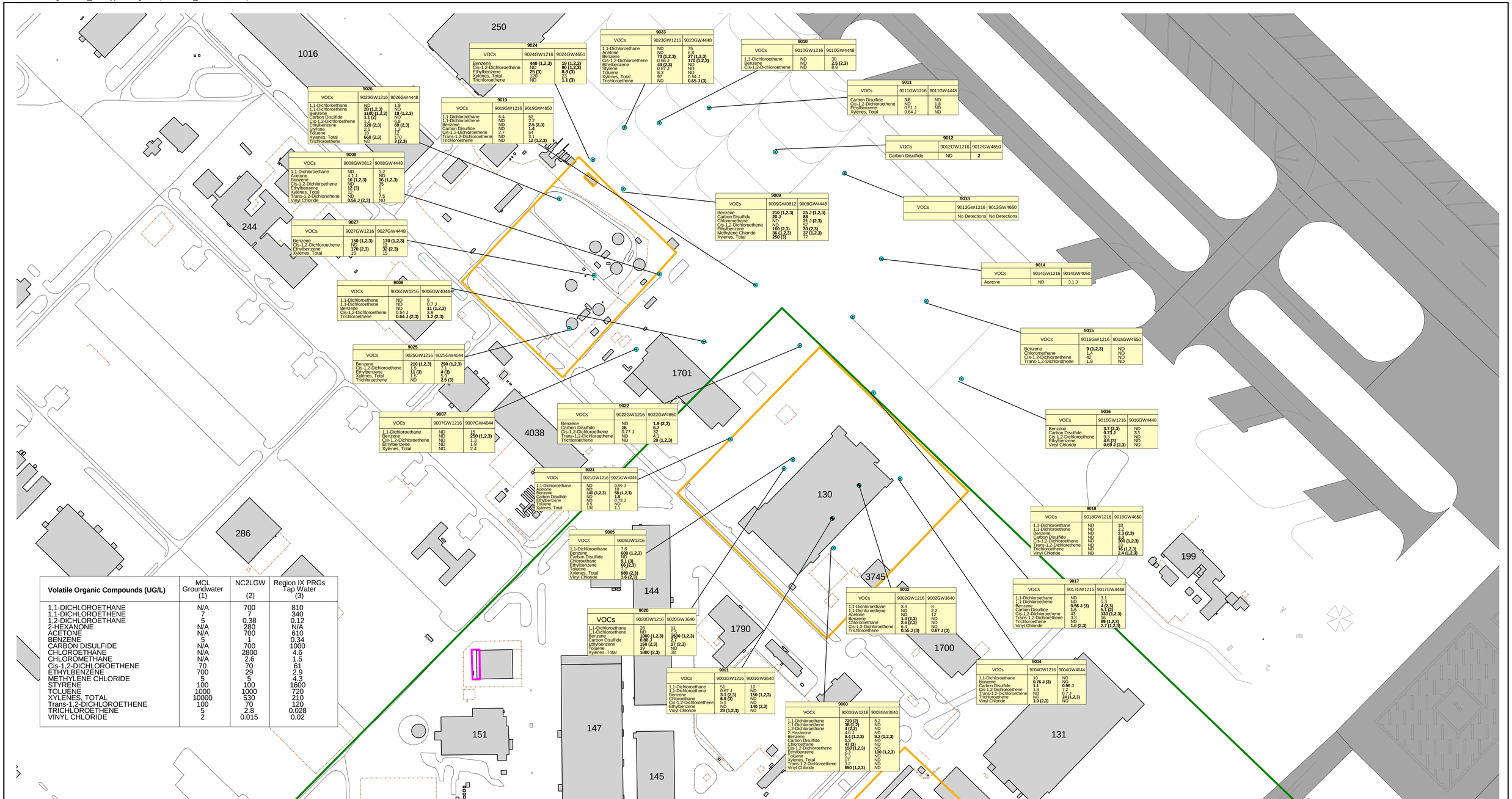
N

0 200 400 Feet

Figure 5
Potentiometric Surface Map -
Lower Surficial Aquifer, October 2002
OU14, Site 90
MCAS Cherry Point

CH2MHILL

File Path: v:\18gis\mcas_cherrypoint\figures\phase1-ri_ou14-site90.apr



Volatile Organic Compounds (UG/L)	MCL Groundwater (1)	NC2LGW (2)	Region IX PRGs Tap Water (3)
1,1-DICHLOROETHANE	N/A	700	810
1,1-DICHLOROETHENE	7	7	340
1,2-DICHLOROETHANE	5	0.38	0.12
2-HEXANONE	N/A	280	N/A
ACETONE	N/A	700	610
BENZENE	5	1	0.34
CARBON DISULFIDE	N/A	700	1000
CHLOROETHANE	N/A	2800	4.6
CHLOROMETHANE	N/A	2.6	1.5
Cis-1,2-DICHLOROETHENE	70	70	61
ETHYLBENZENE	700	29	2.9
METHYLENE CHLORIDE	5	5	4.3
STYRENE	100	100	1600
TOLUENE	1000	1000	720
XYLENES, TOTAL	10000	530	210
Trans-1,2-DICHLOROETHENE	100	70	120
TRICHLOROETHENE	5	2.8	0.028
VINYL CHLORIDE	2	0.015	0.02

LEGEND

- DPT Groundwater Sample Locations
- Buildings
- Roads
- Water Bodies

J - Reported value is estimated

ND - Not Detected

Number in Parentheses Indicates Screening Criteria Exceeded

Results Shown in **bold** text indicate an exceedance of one or more screening criteria

All results are in micrograms per liter (ug/L).

9001GW1216:
9001 - Location ID
GW - Indicates Groundwater sample
1216 - Sample collected from 12 - 16 feet bgs

N

200 0 200 400 Feet

Figure 6
Phase I RI Groundwater VOC Detects and Exceedances
OU14, Site90
MCAS Cherry Point

File Path: v:\18gis\mcas_cherrypoint\figures\phase1-ri_ou14_site90.apr

9026	
VOCs	9026SB0607
Acetone	72 J
Benzene	**43 J (1)**
Chloromethane	8.5 J
Cumene	550 J
Cyclohexane	520 J
Ethylbenzene	**1,800 J (1)**
Methylcyclohexane	2,000 J
Styrene	36 J
Toluene	560 J
Xylenes, Total	1,900 J

9024	
VOCs	9024SB0203
Acetone	49
Benzene	5.1
Chloromethane	4.7 J
Cumene	190
Cyclohexane	260 J
Ethylbenzene	**520 J (1)**
Methylcyclohexane	1,700 J
Xylenes, Total	610 J

9009	
VOCs	9009SB0708
1,1,2,2-Tetrachloroethane	**3,200 J (1,2)**
1,1,2-Trichloroethane	**2,500 J (1,2)**
1,2-Dibromo-3-chloropropane	**3,900 J (1,2)**
2-Butanone	**5,800 J (1)**
2-Hexanone	19,000
4-Methyl-2-pentanone	53,000
Acetone	**25,000 (1)**
Benzene	**8,000 (1,2)**
Bromodichloromethane	**3,200 J (1,2)**
Cumene	8,400
Cyclohexane	**520,000 (2)**
Ethylbenzene	**56,000 (1,2)**
Methyl acetate	800,000
Methylcyclohexane	46,000
Xylenes, Total	**160,000 (1)**

9027	
VOCs	9027SB0607
Acetone	34 J
Cumene	200 J
Ethylbenzene	**1,600 J (1)**
Toluene	4.5 J
Xylenes, Total	1,400 J

9008	
VOCs	9008SB0203
2-Butanone	10
Acetone	51
Cyclohexane	11
Ethylbenzene	1.9 J
Methylcyclohexane	21
Xylenes, Total	6.1

9025	
VOCs	9025SB1011
Benzene	**210 (1)**
Chloromethane	7.7 J
Cumene	32
Ethylbenzene	**300 J (1)**
Methylcyclohexane	900 J
Toluene	8.1
Xylenes, Total	160
cis-1,2-Dichloroethene	7.2 J

9006	
VOCs	9006SB0203
2-Butanone	4.5 J
Acetone	48
Xylenes, Total	2 J

9007	
VOCs	9007SB0607
Xylenes, Total	4.6 J

9021	
VOCs	9021SB0506
Chloromethane	3.6 J
Cyclohexane	83 J
Methylcyclohexane	58 J
Xylenes, Total	3.9 J

Volatile Organic Compounds (ug/kg)	NC-Revissed Draft SSLs (1)	Region IX PRGs-Industrial Soil (2)
1,1,2,2-Tetrachloroethane	0.953	930
1,1,2-Trichloroethane	3.34	1,600
1,2-Dibromo-3-chloropane	0.15	2,000
2-Butane	692	27,000,000
2-Hexanone	--	--
4-Methyl-2-pentanone	--	2,800,000
Acetone	2,810	6,000,000
Benzene	5.62	1,300
Bromodichloromethane	3.13	1,800
Chloromethane	--	2,600
Cumene	--	2,000,000
Cyclohexane	--	140,000
Ethylbenzene	241	20,000
Methyl acetate	--	92,000,000
Methylcyclohexane	--	8,700,000
Styrene	2,240	1,700,000
Toluene	7,270	520,000
Xylenes, Total	4,960	420,000
cis-1,2-Dichloroethene	350	150,000

LEGEND

- Soil Sample Locations
- Buildings
- Roads
- Water Bodies

J - Reported value is estimated

All results are in micrograms per kilogram (ug/kg).

Number in parentheses indicates screening criteria exceeded

Results Shown in **bold** text indicate an exceedance of one or more screening criteria

9006SB0607:
- 9006 - Location ID
- SB - Indicates Subsurface Soil Sample
- 0607 - Sample collected from 6-7 feet bgs

N

0 800 1600 Feet

Figure 7
Phase I RI Subsurface Soil VOC Detects and Exceedances
OU14, Site90
MCAS Cherry Point

CH2MHILL

File Path: v:\18gis\mcas_cherrypoint\figures\phase1-ri_ou14_site90.apr

56GW09	
CVOC	Conc.
cis-1,2-Dichloroethene	8.0
Trichloroethene	140.0

56GW08	
CVOC	Conc.
cis-1,2-Dichloroethene	25.0
Tetrachloroethene	4.0
Trichloroethene	1.0

66GW04	
CVOC	Conc.
1,1-Dichloroethane	2.0
cis-1,2-Dichloroethene	11.0

66GW20
No Detections

66GW35	
CVOC	Conc.
cis-1,2-Dichloroethene	4.0
Trichloroethene	2.0

56GW02	
CVOC	Conc.
cis-1,2-Dichloroethene	5.0
Trichloroethene	110.0

13GW11	
CVOC	Conc.
1,1-Dichloroethane	21.0
cis-1,2-Dichloroethene	200.0

13GW29	
CVOC	Conc.
cis-1,2-Dichloroethene	33.0

13GW17	
CVOC	Conc.
cis-1,2-Dichloroethene	2.0

13GW142	
CVOC	Conc.
cis-1,2-Dichloroethene	450.0
Tetrachloroethene	230.0
Trichloroethene	140.0
Vinyl Chloride	100.0

13GW12	
CVOC	Conc.
1,1-Dichloroethane	12.0
cis-1,2-Dichloroethene	6.0
Cholorethane	3.0

72GW23	
CVOC	Conc.
cis-1,2-Dichloroethene	5.50
Chloroethane	3.60
Trichloroethene	3.90

72GW10	
CVOC	Conc.
1,1-Dichloroethane	17.0

72GW27	
CVOC	Conc.
1,1-Dichloroethane	45.0
cis-1,2-Dichloroethene	2.50

72GW28	
CVOC	Conc.
1,1-Dichloroethane	3.90
cis-1,2-Dichloroethene	1.50
Vinyl Chloride	1.80

72GW29	
CVOC	Conc.
1,1-Dichloroethane	4.80
cis-1,2-Dichloroethene	5.10

74GW15
No Detections

4075 250 1016 244 4066 1701 4038 130 3745 1700 144 147 1669 131 150 148

LEGEND

- Monitoring Well
- Buildings
- Roads
- Water Bodies

All results are in micrograms per liter (ug/L)

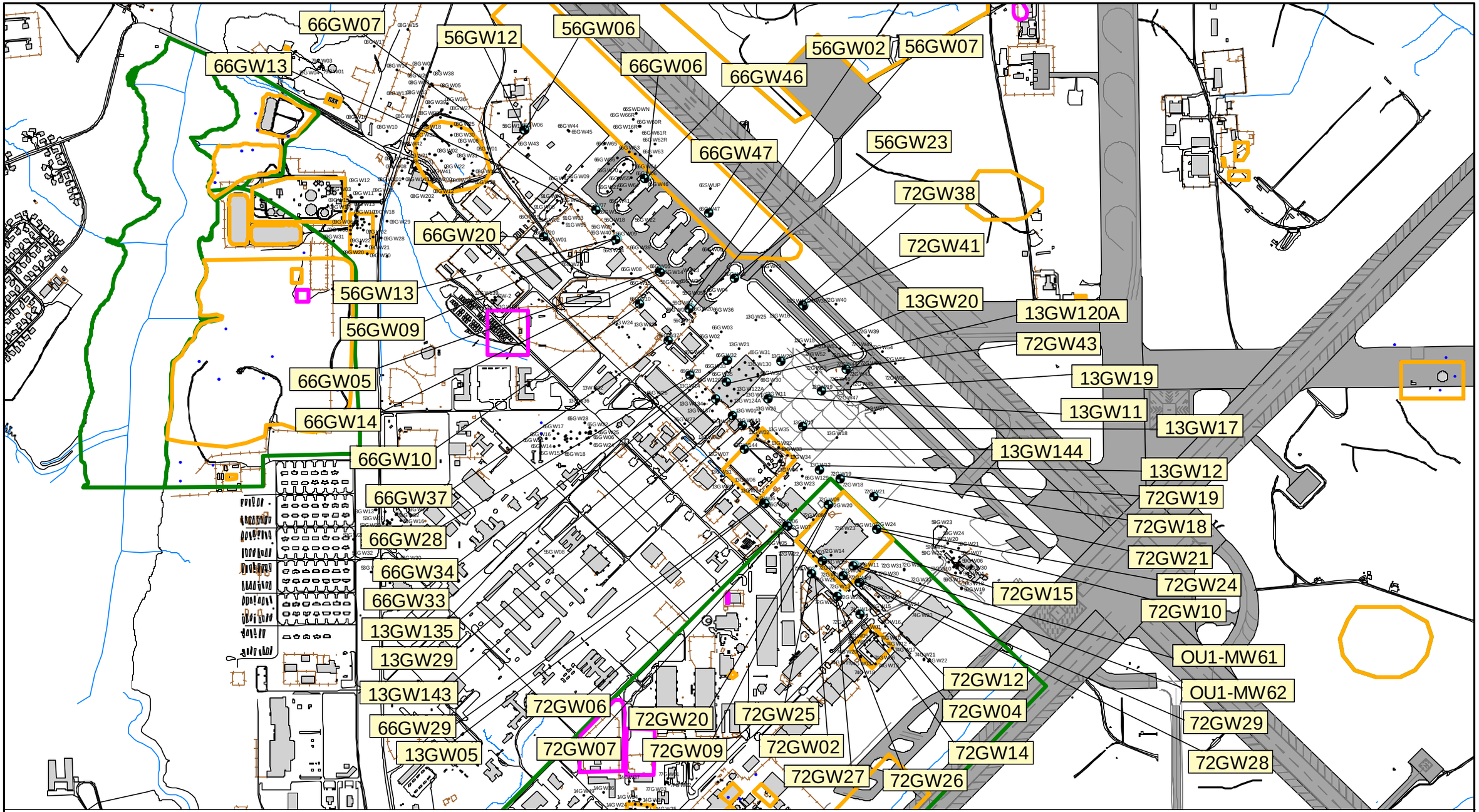
N

0 500 1000 Feet

Figure 8
UST Program Groundwater Sample CVOC Concentrations - February 2002
OU14, Site 90
MCAS Cherry Point

CH2MHILL

File Path: v:\18gis\mcas_cherrypoint\figures\phase1-ri_ou14_site90.apr



LEGEND

- Monitoring Well
- Buildings
- Roads
- Water Bodies

Note:
Well IDs in call out boxes are proposed Phase II sampling locations.

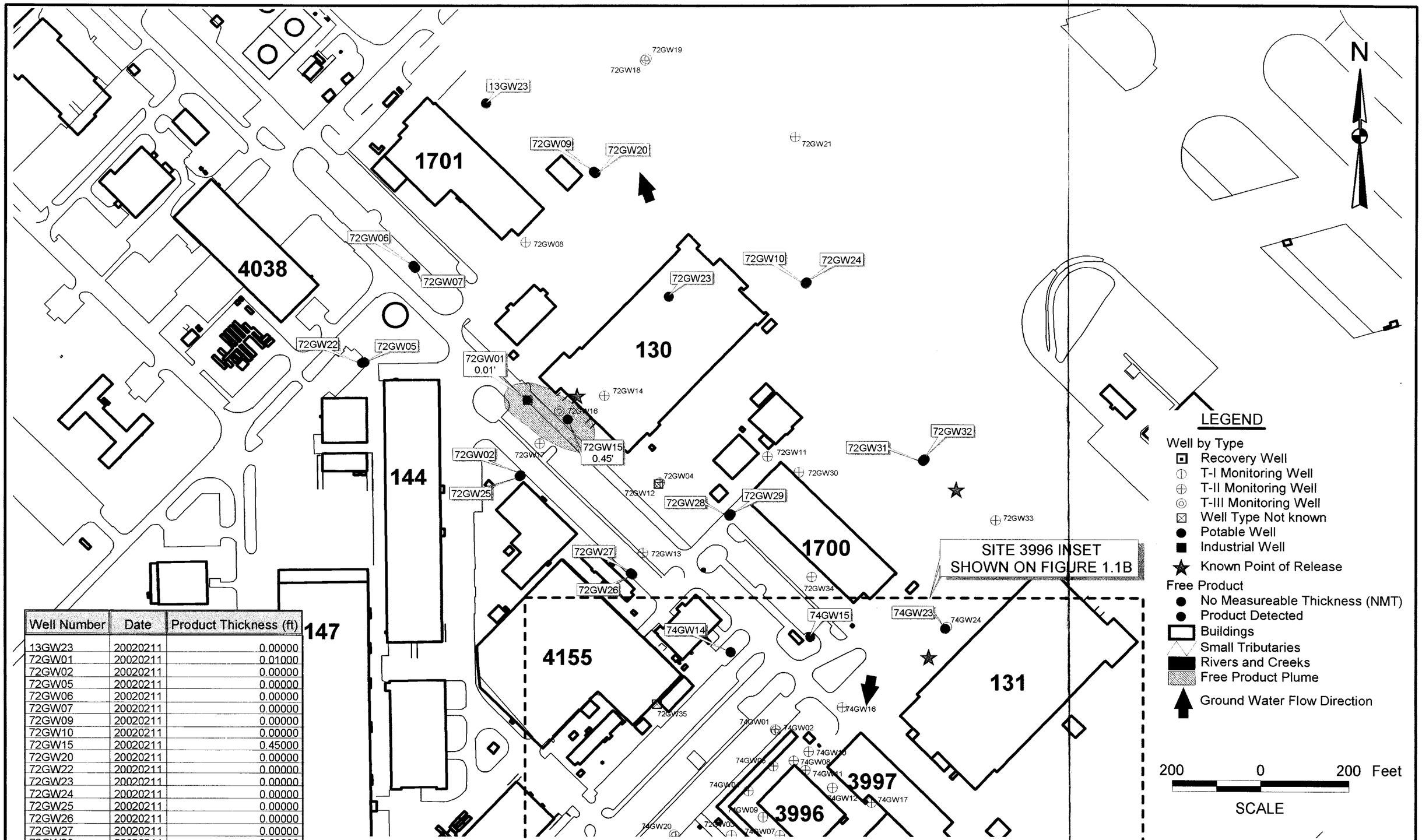
N

0 500 1000 Feet

Figure 9
Proposed Phase II Sample Locations
OU14, Site 90
MCAS Cherry Point

CH2MHILL

Appendix B
UST Long-Term Monitoring Maps

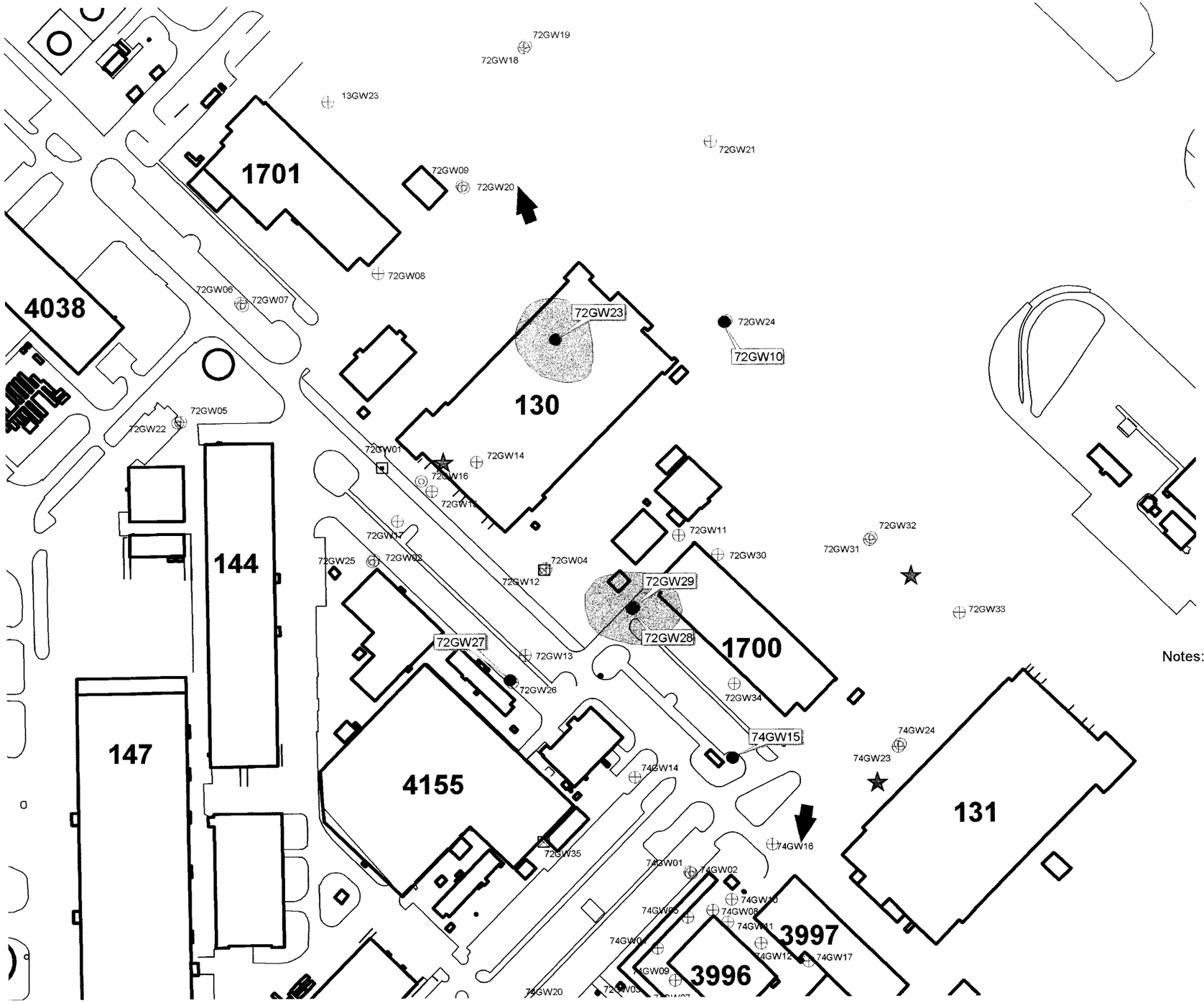


Well Number	Date	Product Thickness (ft)
13GW23	20020211	0.00000
72GW01	20020211	0.01000
72GW02	20020211	0.00000
72GW05	20020211	0.00000
72GW06	20020211	0.00000
72GW07	20020211	0.00000
72GW09	20020211	0.00000
72GW10	20020211	0.00000
72GW15	20020211	0.45000
72GW20	20020211	0.00000
72GW22	20020211	0.00000
72GW23	20020211	0.00000
72GW24	20020211	0.00000
72GW25	20020211	0.00000
72GW26	20020211	0.00000
72GW27	20020211	0.00000
72GW28	20020211	0.00000
72GW29	20020211	0.00000
72GW31	20020211	0.00000
72GW32	20020211	0.00000
74GW14	20020211	0.00000
74GW15	20020211	0.00000

Note: 1. The "Date" field in the table should be interpreted as "YYYYMMDD". For example 20020211 represents February 11, 2002.

CATLIN ENGINEERS and SCIENTISTS

PROJECT: MCAS CHERRY POINT UST LONG TERM MONITORING PROGRAM		TITLE: SITE 130 FREE PRODUCT PLUME MAP	FIGURE: 1.1A
JOB NO.: 202-014	DATE: JUL 2002	SCALE: AS SHOWN	DRAWN BY: SAC	CHECKED BY: TWL



N

LEGEND

Well by Type
- Recovery Well
- T-I Monitoring Well
- T-II Monitoring Well
- T-III Monitoring Well
- Well Type Not known
- Potable Well
- Industrial Well
- Known Point of Release
- 601 2L Non-Compliant
- 601 Compliant
- Buildings
- Small Tributaries
- Rivers and Creeks
- EPA Method 601 Plume in Excess of 2L
- Ground Water Flow Direction

Notes:
1. 2L Standard refers to North Carolina Ground Water Quality Standard 15A NCAC 2L.0202
2. GCL refers to Gross Contaminant Level as defined in Table 7 of "Groundwater Section Guidelines for the Investigation and Remediation of Soil and Ground Water", Volume II, dated January 2, 1998
3. A 2L Standard of "0.00" implies a standard has not yet been established. According to NCAC T15A:02L, any compound found above laboratory detection limits is considered noncompliant unless otherwise specified by the NCDENR.
4. The "Date Sampled" field in the table should be interpreted as "YYYYMMDD". For example 20020211 represents February 11, 2002.

200 0 200 Feet

SCALE

Sample ID	Date Sampled	Method	Parameter	Result	Units	2L Standard	GCL
72GW23	20020211	EPA 601	Trichloroethene	3.90000	ug/L	2.80000	0.00000
72GW28	20020211	EPA 601	Vinyl Chloride	1.50000	ug/L	0.01000	0.00000
72GW28DUP	20020211	EPA 601	Vinyl Chloride	1.80000	ug/L	0.01000	0.00000

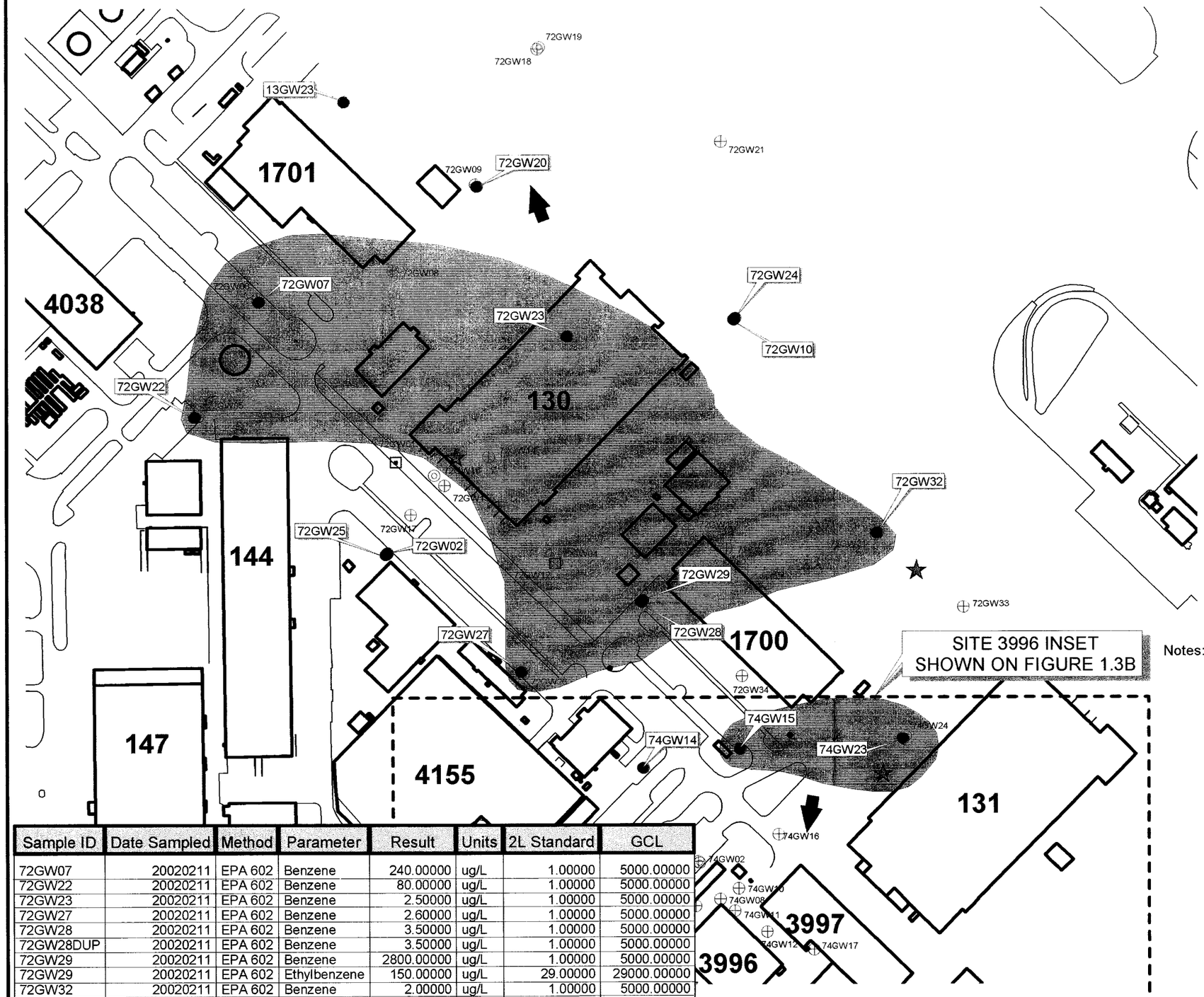
CATLIN ENGINEERS and SCIENTISTS

PROJECT: MCAS CHERRY POINT UST LONG TERM MONITORING PROGRAM

TITLE: SITE 130 EPA METHOD 601 COLORIMETRY AND PLUME IN EXCESS OF 2L

FIGURE: 1.2

JOB NO.: 202-014 | DATE: JUL 2002 | SCALE: AS SHOWN | DRAWN BY: SAC | CHECKED BY: TWL



LEGEND

Well by Type
- Recovery Well
- T-I Monitoring Well
- T-II Monitoring Well
- T-III Monitoring Well
- Well Type Not known
- Potable Well
- Industrial Well
- Known Point of Release
- 602 2L Non-Compliant
- 602 2L Compliant
- Buildings
- Small Tributaries
- Rivers and Creeks
- EPA Method 602 Plume in Excess of 2L
- Ground Water Flow Direction

Notes:
1. 2L Standard refers to North Carolina Ground Water Quality Standard 15A NCAC 2L.0202
2. GCL refers to Gross Contaminant Level as defined in Table 7 of "Groundwater Section Guidelines for the Investigation and Remediation of Soil and Ground Water", Volume II, dated January 2, 1998
3. A 2L Standard of "0.00" implies a standard has not yet been established. According to NCAC T15A:02L, any compound found above laboratory detection limits is considered noncompliant unless otherwise specified by the NCDENR.
4. The "Date Sampled" field in the table should be interpreted as "YYYYMMDD". For example 20020211 represents February 11, 2002.

200 0 200 Feet

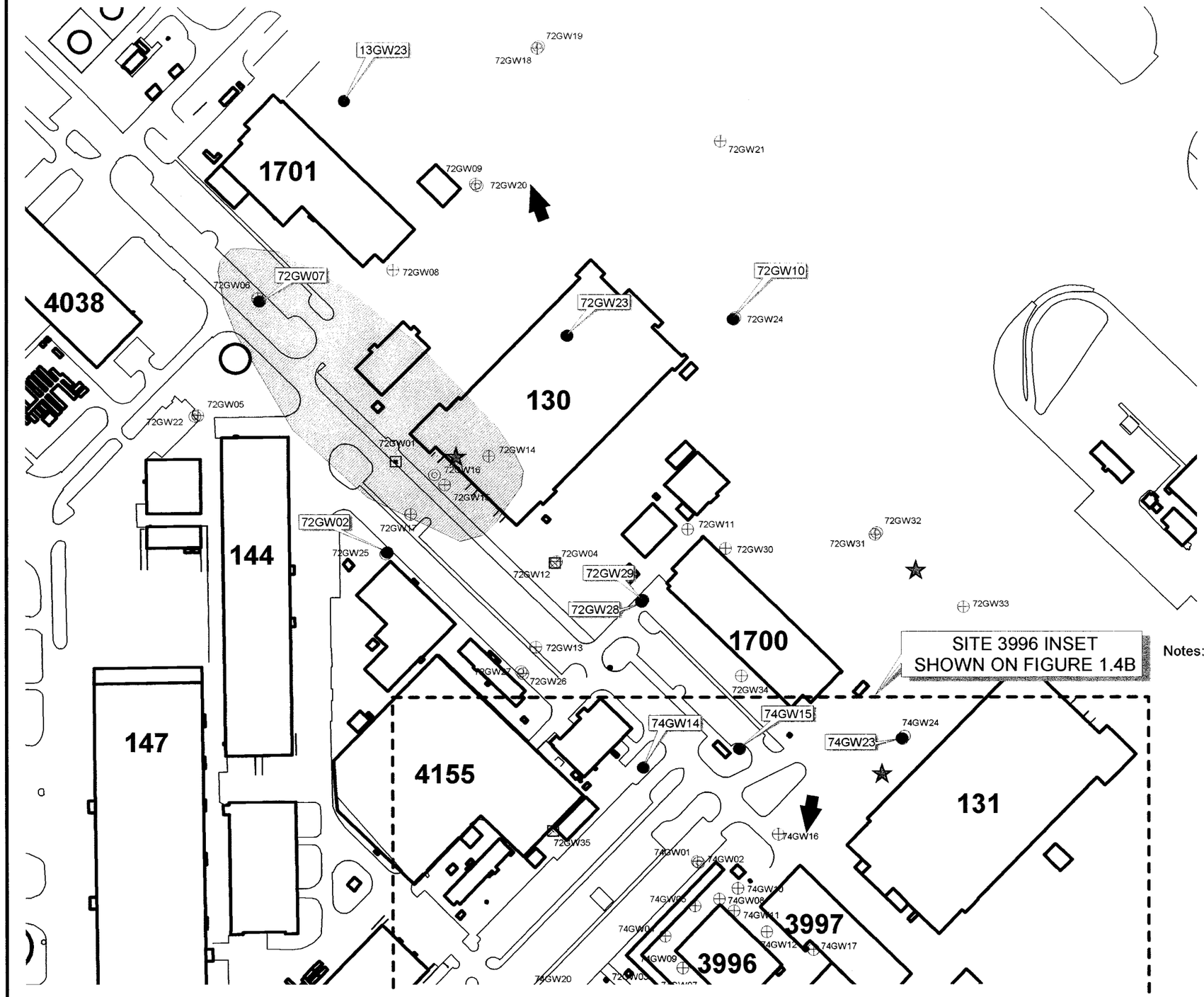
SCALE

Sample ID	Date Sampled	Method	Parameter	Result	Units	2L Standard	GCL
72GW07	20020211	EPA 602	Benzene	240.00000	ug/L	1.00000	5000.00000
72GW22	20020211	EPA 602	Benzene	80.00000	ug/L	1.00000	5000.00000
72GW23	20020211	EPA 602	Benzene	2.50000	ug/L	1.00000	5000.00000
72GW27	20020211	EPA 602	Benzene	2.60000	ug/L	1.00000	5000.00000
72GW28	20020211	EPA 602	Benzene	3.50000	ug/L	1.00000	5000.00000
72GW28DUP	20020211	EPA 602	Benzene	3.50000	ug/L	1.00000	5000.00000
72GW29	20020211	EPA 602	Benzene	2800.00000	ug/L	1.00000	5000.00000
72GW29	20020211	EPA 602	Ethylbenzene	150.00000	ug/L	29.00000	29000.00000
72GW32	20020211	EPA 602	Benzene	2.00000	ug/L	1.00000	5000.00000
74GW15	20020211	EPA 602	Benzene	3500.00000	ug/L	1.00000	5000.00000
74GW15	20020211	EPA 602	Ethylbenzene	180.00000	ug/L	29.00000	29000.00000
74GW15	20020211	EPA 602	Total Xylenes	610.00000	ug/L	530.00000	87500.00000
74GW23	20020211	EPA 602	Benzene	33000.00000	ug/L	1.00000	5000.00000
74GW23	20020211	EPA 602	Ethylbenzene	1600.00000	ug/L	29.00000	29000.00000
74GW23	20020211	EPA 602	Toluene	24000.00000	ug/L	1000.00000	257500.00000
74GW23	20020211	EPA 602	Total Xylenes	10700.00000	ug/L	530.00000	87500.00000

CATLIN ENGINEERS and SCIENTISTS

PROJECT	TITLE	FIGURE
MCAS CHERRY POINT UST LONG TERM MONITORING PROGRAM	SITE 130 EPA METHOD 602 COLORIMETRY AND PLUME IN EXCESS OF 2L	1.3A

JOB NO.:	DATE:	SCALE:	DRAWN BY:	CHECKED BY:
202-014	JUL 2002	AS SHOWN	SAC	TWL



N

LEGEND

Well by Type
- Recovery Well
- T-I Monitoring Well
- T-II Monitoring Well
- T-III Monitoring Well
- Well Type Not known
- Potable Well
- Industrial Well
- Known Point of Release
- 610 2L Non-Compliant
- 610 2L Compliant
- Buildings
- Small Tributaries
- Rivers and Creeks
- EPA Method 610 Plume in Excess of 2L
- Ground Water Flow Direction

Notes:
1. 2L Standard refers to North Carolina Ground Water Quality Standard 15A NCAC 2L.0202
2. GCL refers to Gross Contaminant Level as defined in Table 7 of "Groundwater Section Guidelines for the Investigation and Remediation of Soil and Ground Water", Volume II, dated January 2, 1998
3. A 2L Standard of "0.00" implies a standard has not yet been established. According to NCAC T15A:02L, any compound found above laboratory detection limits is considered noncompliant unless otherwise specified by the NCDENR.
4. The "Date Sampled" field in the table should be interpreted as "YYYYMMDD". For example 20020211 represents February 11, 2002.

200 0 200 Feet

SCALE

Sample ID	Date Sampled	Method	Parameter	Result	Units	2L Standard	GCL
72GW07	20020211	EPA 610	1-Methylnaphthalene	23.00000	ug/L	0.00000	0.00000
72GW07	20020211	EPA 610	Naphthalene	190.00000	ug/L	21.00000	15500.00000

CATLIN ENGINEERS and SCIENTISTS

PROJECT: MCAS CHERRY POINT UST LONG TERM MONITORING PROGRAM

TITLE: SITE 130 EPA METHOD 610 COLORIMETRY AND PLUME IN EXCESS OF 2L

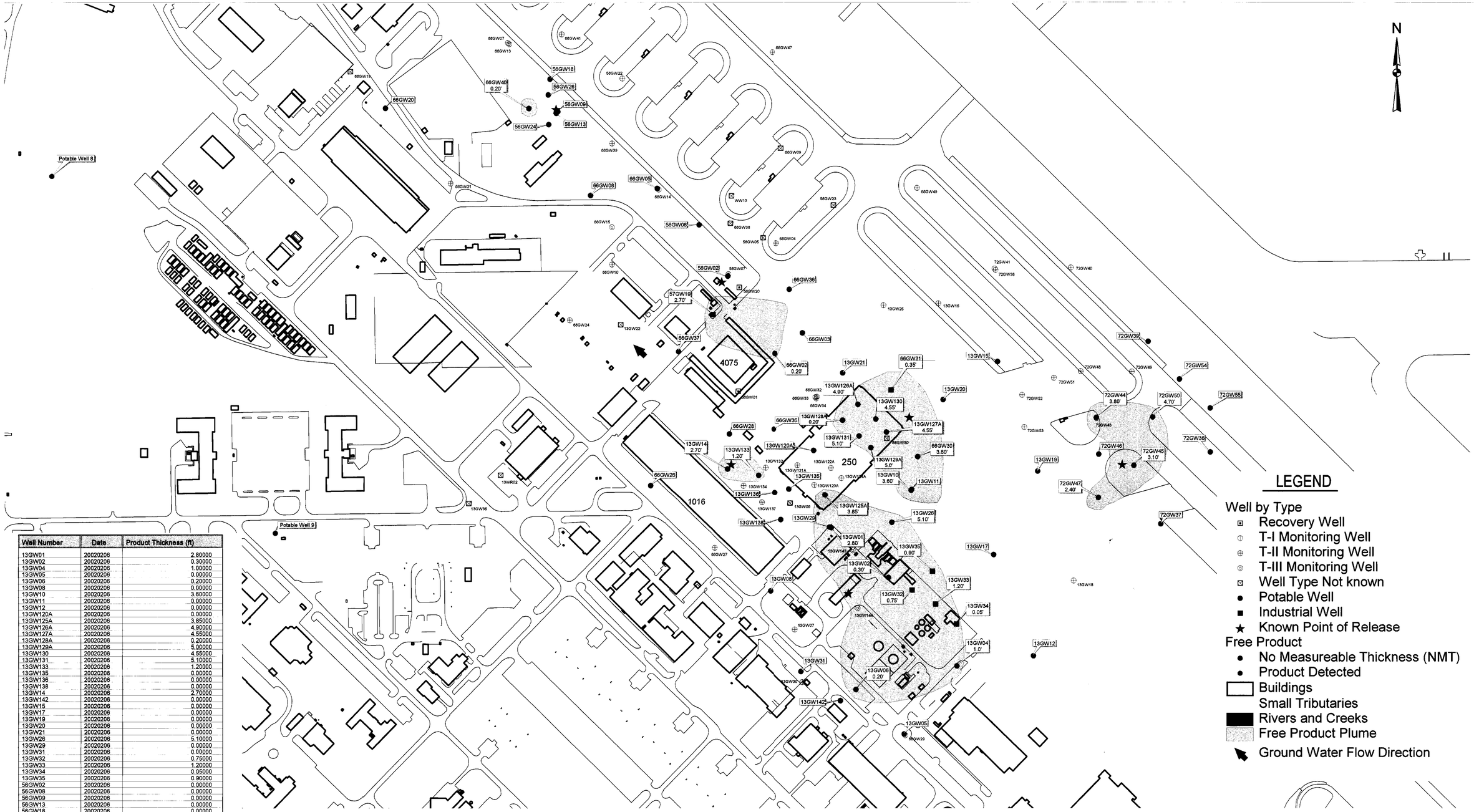
FIGURE: 1.4A

JOB NO.: 202-014 | DATE: JUL 2002 | SCALE: AS SHOWN | DRAWN BY: SAC | CHECKED BY: TWL

CATLIN ENGINEERS and SCIENTISTS

PROJECT	TITLE	FIGURE
MCAS CHERRY POINT UST LONG TERM MONITORING PROGRAM	SITE 130/4075 SITE MAP WITH MONITORING WELL NETWORK AS OF 12/02/02	1

JOB NO.:	DATE:	SCALE:	DRAWN BY:	CHECKED BY:
	DEC 2002	AS SHOWN	SAC	TWL



Well Number	Date	Product Thickness (ft)
13GW01	20020206	2.80000
13GW02	20020206	0.30000
13GW04	20020206	1.00000
13GW05	20020206	0.00000
13GW06	20020206	0.20000
13GW08	20020206	0.00000
13GW10	20020206	3.60000
13GW11	20020206	0.00000
13GW12	20020206	0.00000
13GW120A	20020206	0.00000
13GW125A	20020206	3.85000
13GW126A	20020206	4.90000
13GW127A	20020206	4.55000
13GW128A	20020206	0.20000
13GW129A	20020206	5.00000
13GW130	20020206	4.55000
13GW131	20020206	5.10000
13GW133	20020206	1.20000
13GW135	20020206	0.00000
13GW136	20020206	0.00000
13GW138	20020206	0.00000
13GW14	20020206	2.70000
13GW142	20020206	0.00000
13GW15	20020206	0.00000
13GW17	20020206	0.00000
13GW19	20020206	0.00000
13GW20	20020206	0.00000
13GW21	20020206	0.00000
13GW26	20020206	5.10000
13GW29	20020206	0.00000
13GW31	20020206	0.00000
13GW32	20020206	0.75000
13GW33	20020206	1.20000
13GW34	20020206	0.05000
13GW35	20020206	0.90000
56GW02	20020206	0.00000
56GW08	20020206	0.00000
56GW09	20020206	0.00000
56GW13	20020206	0.00000
56GW18	20020206	0.00000
56GW19	20020206	2.70000
56GW24	20020206	0.00000
56GW26	20020206	0.00000
66GW02	20020206	0.20000
66GW03	20020206	0.00000
66GW05	20020206	0.00000
66GW08	20020206	0.00000
66GW20	20020206	0.00000
66GW26	20020206	0.00000
66GW28	20020206	0.00000
66GW30	20020206	3.80000
66GW31	20020206	0.35000
66GW35	20020206	0.00000
66GW36	20020206	0.00000
66GW37	20020206	0.00000
66GW40	20020206	0.20000
72GW36	20020206	0.00000
72GW37	20020206	0.00000
72GW39	20020206	0.00000
72GW44	20020206	3.80000
72GW45	20020206	3.10000
72GW46	20020206	0.00000
72GW47	20020206	2.40000
72GW50	20020206	4.70000
72GW54	20020206	0.00000
72GW55	20020206	0.00000

Notes: 1. The "Date" field in the table should be interpreted as "YYYYMMDD". For example 20020206 represents February 6, 2002.

CATLIN ENGINEERS and SCIENTISTS

PROJECT: MCAS CHERRY POINT UST LONG TERM MONITORING PROGRAM

TITLE: SITE 4075 FREE PRODUCT PLUME MAP

FIGURE: 13.1

JOB NO.: 202-014 | DATE: AUG 2002 | SCALE: AS SHOWN | DRAWN BY: SAC | CHECKED BY: TWL

Sample ID	Date Sampled	Method	Parameter	Result	Units	2L Standard	GCL
13GW11	20020206	EPA 601	"cis-1,2-Dichloroethene"	200.00000	ug/L	70.00000	70000.00000
13GW142	20020206	EPA 601	"cis-1,2-Dichloroethene"	450.00000	ug/L	70.00000	70000.00000
13GW142	20020206	EPA 601	Tetrachloroethene	230.00000	ug/L	0.70000	700.00000
13GW142	20020206	EPA 601	Trichloroethene	140.00000	ug/L	2.80000	0.00000
13GW142	20020206	EPA 601	Vinyl Chloride	100.00000	ug/L	0.01000	0.00000
13GW142DUP	20020206	EPA 601	"cis-1,2-Dichloroethene"	420.00000	ug/L	70.00000	70000.00000
13GW142DUP	20020206	EPA 601	Tetrachloroethene	210.00000	ug/L	0.70000	700.00000
13GW142DUP	20020206	EPA 601	Trichloroethene	130.00000	ug/L	2.80000	0.00000
13GW142DUP	20020206	EPA 601	Vinyl Chloride	94.00000	ug/L	0.01000	0.00000
56GW02	20020206	EPA 601	Trichloroethene	110.00000	ug/L	2.80000	0.00000
56GW08	20020206	EPA 601	Tetrachloroethene	4.00000	ug/L	0.70000	700.00000
56GW09	20020206	EPA 601	Trichloroethene	140.00000	ug/L	2.80000	0.00000

Notes:
1. 2L Standard refers to North Carolina Ground Water Quality Standard 15A NCAC 2L.0202
2. GCL refers to Gross Contaminant Level as defined in Table 7 of "Groundwater Section Guidelines for the Investigation and Remediation of Soil and Ground Water", Volume II, dated January 2, 1998
3. A 2L Standard of "0.00000" implies a standard has not yet been established. According to NCAC T15A:02L, any compound found above laboratory detection limits is considered noncompliant unless otherwise specified by the NCDENR.
4. The "Date Sampled" field in the table should be interpreted as "YYYYMMDD". For example 20020206 represents February 6, 2002.
5. Contaminant plume is based on the presence of free product as well as analytical data.

CATLIN ENGINEERS and SCIENTISTS

PROJECT: MCAS CHERRY POINT UST LONG TERM MONITORING PROGRAM

TITLE: SITE 4075 EPA METHOD 601 COLORIMETRY AND PLUME IN EXCESS OF 2L

FIGURE: 13.2

JOB NO.: 202-014 | DATE: JUN 2002 | SCALE: AS SHOWN | DRAWN BY: SAC | CHECKED BY: TWL

Sample ID	Date Sampled	Method	Parameter	Result	Units	2L Standard	GCL
13GW17	20020206	EPA 602	Benzene	8.00000	ug/L	1.00000	5000.00000
13GW21	20020206	EPA 602	Benzene	2.00000	ug/L	1.00000	5000.00000
13GW29	20020206	EPA 602	Benzene	1300.00000	ug/L	1.00000	5000.00000
13GW29	20020206	EPA 602	Methyl-tert-butyl ether (MTBE)	210.00000	ug/L	200.00000	200000.00000
56GW02	20020206	EPA 602	Benzene	46.00000	ug/L	1.00000	5000.00000
56GW08	20020206	EPA 602	Benzene	58.00000	ug/L	1.00000	5000.00000
56GW09	20020206	EPA 602	Benzene	2.00000	ug/L	1.00000	5000.00000
56GW18	20020206	EPA 602	Benzene	9.00000	ug/L	1.00000	5000.00000
56GW18	20020206	EPA 602	Ethylbenzene	33.00000	ug/L	29.00000	29000.00000
66GW28	20020206	EPA 602	Benzene	380.00000	ug/L	1.00000	5000.00000
66GW28	20020206	EPA 602	Ethylbenzene	79.00000	ug/L	29.00000	29000.00000
66GW35	20020206	EPA 602	Benzene	20.00000	ug/L	1.00000	5000.00000

Notes:

1. 2L Standard refers to North Carolina Ground Water Quality Standard 15A NCAC 2L.0202
2. GCL refers to Gross Contaminant Level as defined in Table 7 of "Groundwater Section Guidelines for the Investigation and Remediation of Soil and Ground Water", Volume II, dated January 2, 1998
3. A 2L Standard of "0.00000" implies a standard has not yet been established. According to NCAC T15A:02L, any compound found above laboratory detection limits is considered noncompliant unless otherwise specified by the NCDENR.
4. The "Date Sampled" field in the table should be interpreted as "YYYYMMDD". For example 20020206 represents February 6, 2002.
5. Contaminant plume is based on the presence of free product as well as analytical data.

200 0 200 Feet

SCALE

CATLIN ENGINEERS and SCIENTISTS

PROJECT: MCAS CHERRY POINT UST LONG TERM MONITORING PROGRAM

JOB NO.: 202-014 DATE: JUN 2002 SCALE: AS SHOWN DRAWN BY: SAC CHECKED BY: TWL

TITLE: SITE 4075 EPA METHOD 602 COLORIMETRY AND PLUME IN EXCESS OF 2L

FIGURE 13.3

Sample ID	Date Sampled	Method	Parameter	Result	Units	2L Standard	GCL
13GW21	20020206	EPA 610	1-Methylnaphthalene	26.00000	ug/L	0.00000	0.00000
13GW21	20020206	EPA 610	Naphthalene	28.00000	ug/L	21.00000	15500.00000
56GW08	20020206	EPA 610	1-Methylnaphthalene	13.00000	ug/L	0.00000	0.00000
66GW28	20020206	EPA 610	1-Methylnaphthalene	40.00000	ug/L	0.00000	0.00000
66GW28	20020206	EPA 610	2-Methylnaphthalene	56.00000	ug/L	28.00000	12500.00000
66GW28	20020206	EPA 610	Naphthalene	120.00000	ug/L	21.00000	15500.00000
66GW35	20020206	EPA 610	1-Methylnaphthalene	24.00000	ug/L	0.00000	0.00000
66GW35	20020206	EPA 610	Naphthalene	280.00000	ug/L	21.00000	15500.00000

Notes:
1. 2L Standard refers to North Carolina Ground Water Quality Standard 15A NCAC 2L.0202
2. GCL refers to Gross Contaminant Level as defined in Table 7 of "Groundwater Section Guidelines for the Investigation and Remediation of Soil and Ground Water", Volume II, dated January 2, 1998
3. A 2L Standard of "0.00000" implies a standard has not yet been established. According to NCAC T15A:02L, any compound found above laboratory detection limits is considered noncompliant unless otherwise specified by the NCDENR.
4. The "Date Sampled" field in the table should be interpreted as "YYYYMMDD". For example 20020206 represents February 6, 2002.
5. Contaminant plume is based on the presence of free product as well as analytical data.

200 0 200 Feet
SCALE

CATLIN ENGINEERS and SCIENTISTS

PROJECT: MCAS CHERRY POINT UST LONG TERM MONITORING PROGRAM

TITLE: SITE 4075 EPA METHOD 610 COLORIMETRY AND PLUME IN EXCESS OF 2L

FIGURE 13.4

JOB NO.: 202-014 | DATE: JUN 2002 | SCALE: AS SHOWN | DRAWN BY: SAC | CHECKED BY: TWL

TABLE 13.2

SITE 4075

GROUND WATER LABORATORY ANALYTICAL RESULTS

EPA 601

Date Sampled: 2/6/02

PARAMETER	2L	GCL	UNITS	13GW11	13GW12	13GW142	13GW142DUP	13GW17	13GW29	56GW02	56GW08	56GW09	66GW04	66GW20	66GW35
"1,1,1-Trichloroethane"	200.0000	0.0000	ug/L	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1,1,2,2-Tetrachloroethane"	0.1700	170.0000	ug/L	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
"1,1,2-Trichloroethane"	0.0000	0.0000	ug/L	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
"1,1-Dichloroethane"	700.0000	700,000.0000	ug/L	21.00	12.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.00	0.00	0.00
"1,1-Dichloroethene"	7.0000	7,000.0000	ug/L	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
"1,2-Dichlorobenzene"	620.0000	72,500.0000	ug/L	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
"1,2-Dichloroethane"	0.3800	380.0000	ug/L	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
"1,2-Dichloropropane"	0.5600	560.0000	ug/L	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
"1,3-Dichlorobenzene"	620.0000	61,500.0000	ug/L	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
"1,4-Dichlorobenzene"	75.0000	39,500.0000	ug/L	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
"cis-1,2-Dichloroethene"	70.0000	70,000.0000	ug/L	200.00	6.00	450.00	420.00	2.00	33.00	5.00	25.00	8.00	11.00	0.00	4.00
"cis-1,3-Dichloropropene"	0.2000	200.0000	ug/L	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
"trans-1,2-Dichloroethene"	70.0000	70,000.0000	ug/L	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
trans-1,3-Dichloropropene"	0.2000	200.0000	ug/L	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bromodichloromethane	0.6000	0.0000	ug/L	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bromoform	0.1900	0.0000	ug/L	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bromomethane	0.0000	0.0000	ug/L	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Carbon tetrachloride	0.3000	0.0000	ug/L	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Chlorobenzene	50.0000	0.0000	ug/L	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Chloroethane	2,800.0000	0.0000	ug/L	0.00	3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Chloroform	0.1900	0.0000	ug/L	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Chloromethane	2.6000	2,600.0000	ug/L	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dibromochloromethane	0.4100	0.0000	ug/L	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EDB	0.0004	50.0000	ug/L	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Methylene Chloride	5.0000	5,000.0000	ug/L	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tetrachloroethene	0.7000	700.0000	ug/L	0.00	0.00	230.00	210.00	0.00	0.00	0.00	4.00	0.00	0.00	0.00	0.00
Trichloroethene	2.8000	0.0000	ug/L	0.00	0.00	140.00	130.00	0.00	0.00	110.00	1.00	140.00	0.00	0.00	2.00
Trichlorofluoromethane	2,100.0000	0.0000	ug/L	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vinyl Chloride	0.0100	0.0000	ug/L	0.00	0.00	100.00	94.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Totals:				**221.00**	**21.00**	**920.00**	**854.00**	**2.00**	**33.00**	**115.00**	**30.00**	**148.00**	**13.00**	**0.00**	**6.00**

Notes:
1. 2L = North Carolina groundwater quality standard 15A NCAC 2L .0202
2. GCL = Gross Contamination Levels for ground water as defined in "Groundwater Section Guidelines for the Investigation and Remediation of Soil and Groundwater" Volume II January, 1998
3. ug/L = Micrograms per Liter
4. A zero ("0.00") in the results column indicates concentration is either below detection limit or below quantitation
5. A zero ("0.0000") in the 2L column indicates the 2L standard is equal to the laboratory detection limit
6. A zero ("0.0000") jn the GCL column indicates a GCL has not been established

TABLE 1.2

SITE 130

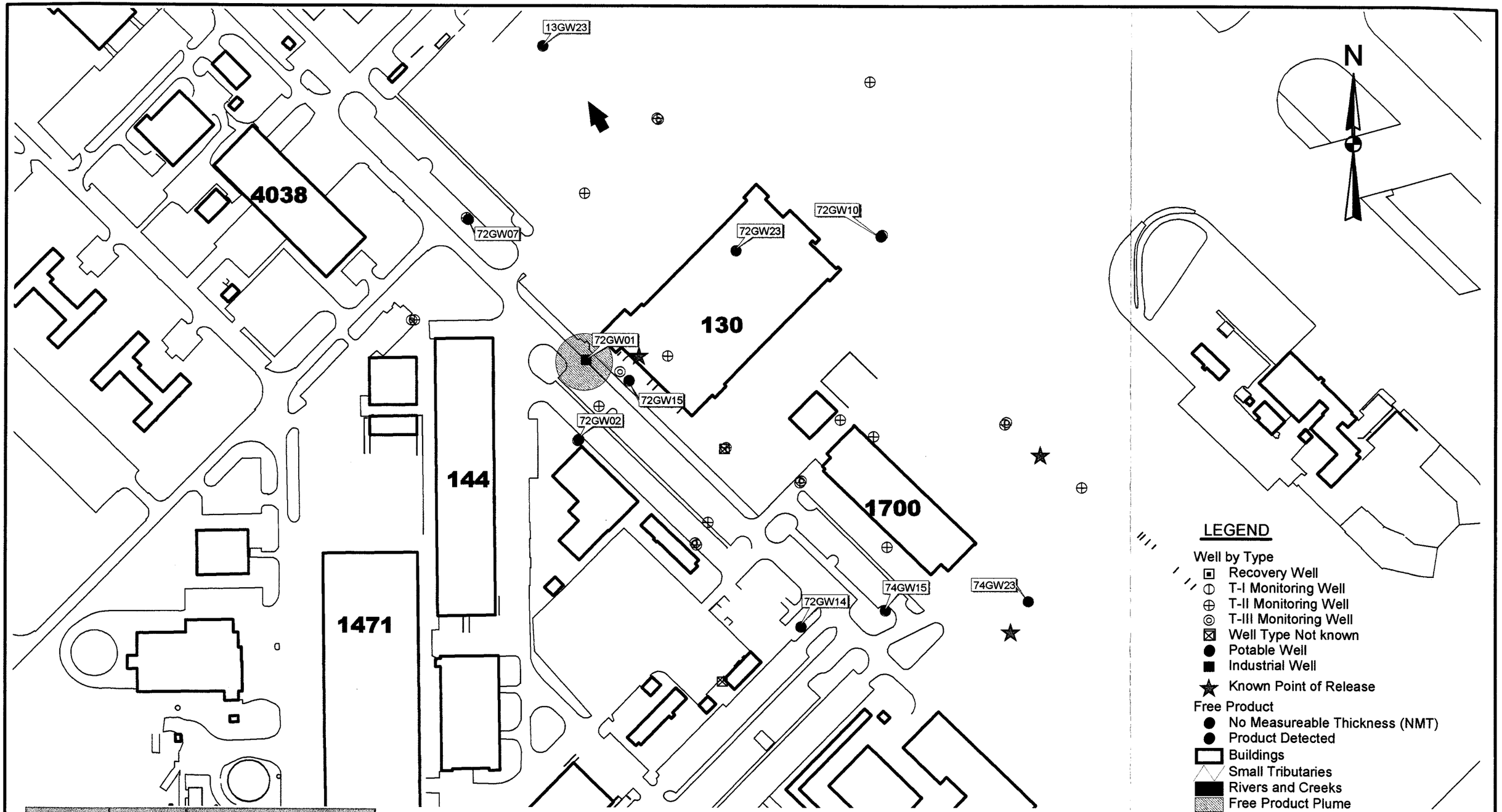
GROUND WATER LABORATORY ANALYTICAL RESULTS

EPA 601

Date Sampled: 2/11/02

PARAMETER	2L	GCL	UNITS	72GW10	72GW23	72GW27	72GW28	72GW28DUP	72GW29	74GW15
"1,1,1-Trichloroethane"	200.0000	0.0000	ug/L	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1,1,2,2-Tetrachloroethane"	0.1700	170.0000	ug/L	0.00	0.00	0.00	0.00	0.00	0.00	0.00
"1,1,2-Trichloroethane"	0.0000	0.0000	ug/L	0.00	0.00	0.00	0.00	0.00	0.00	0.00
"1,1-Dichloroethane"	700.0000	700,000.0000	ug/L	0.00	0.00	45.00	3.40	3.90	4.80	0.00
"1,1-Dichloroethene"	7.0000	7,000.0000	ug/L	0.00	0.00	0.00	0.00	0.00	0.00	0.00
"1,2-Dichlorobenzene"	620.0000	72,500.0000	ug/L	0.00	0.00	0.00	0.00	0.00	0.00	0.00
"1,2-Dichloroethane"	0.3800	380.0000	ug/L	0.00	0.00	0.00	0.00	0.00	0.00	0.00
"1,2-Dichloropropane"	0.5600	560.0000	ug/L	0.00	0.00	0.00	0.00	0.00	0.00	0.00
"1,3-Dichlorobenzene"	620.0000	61,500.0000	ug/L	0.00	0.00	0.00	0.00	0.00	0.00	0.00
"1,4-Dichlorobenzene"	75.0000	39,500.0000	ug/L	0.00	0.00	0.00	0.00	0.00	0.00	0.00
"cis-1,2-Dichloroethene"	70.0000	70,000.0000	ug/L	17.00	5.50	2.50	1.30	1.50	5.10	0.00
"cis-1,3-Dichloropropene"	0.2000	200.0000	ug/L	0.00	0.00	0.00	0.00	0.00	0.00	0.00
"trans-1,2-Dichloroethene"	70.0000	70,000.0000	ug/L	0.00	0.00	0.00	0.00	0.00	0.00	0.00
trans-1,3-Dichloropropene"	0.2000	200.0000	ug/L	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bromodichloromethane	0.6000	0.0000	ug/L	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bromoform	0.1900	0.0000	ug/L	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bromomethane	0.0000	0.0000	ug/L	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Carbon tetrachloride	0.3000	0.0000	ug/L	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Chlorobenzene	50.0000	0.0000	ug/L	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Chloroethane	2,800.0000	0.0000	ug/L	0.00	3.60	0.00	0.00	0.00	0.00	0.00
Chloroform	0.1900	0.0000	ug/L	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Chloromethane	2.6000	2,600.0000	ug/L	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dibromochloromethane	0.4100	0.0000	ug/L	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EDB	0.0004	50.0000	ug/L	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Methylene Chloride	5.0000	5,000.0000	ug/L	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tetrachloroethene	0.7000	700.0000	ug/L	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Trichloroethene	2.8000	0.0000	ug/L	0.00	3.90	0.00	0.00	0.00	0.00	0.00
Trichlorofluoromethane	2,100.0000	0.0000	ug/L	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vinyl Chloride	0.0100	0.0000	ug/L	0.00	0.00	0.00	1.50	1.80	0.00	0.00
Totals:				**17.00**	**13.00**	**47.50**	**6.20**	**7.20**	**9.90**	**0.00**

Notes:
1. 2L = North Carolina groundwater quality standard 15A NCAC 2L .0202
2. GCL = Gross Contamination Levels for ground water as defined in "Groundwater Section Guidelines for the Investigation and Remediation of Soil and Groundwater" Volume II January, 1998
3. ug/L = Micrograms per Liter
4. A zero ("0.00") in the results column indicates concentration is either below detection limit or below quantitation
5. A zero ("0.0000") in the 2L column indicates the 2L standard is equal to the laboratory detection limit
6. A zero ("0.0000") jn the GCL column indicates a GCL has not been established



Well Number	Date	Product Thickness (ft)
13GW23	20010208	0.00000
72GW01	20010208	0.20000
72GW02	20010208	0.00000
72GW07	20010208	0.00000
72GW10	20010208	0.00000
72GW15	20010208	0.00000
72GW23	20010208	0.00000
74GW14	20010208	0.00000
74GW15	20010208	0.00000
74GW23	20010208	0.00000

Note: 1. The "Date" field in the table should be interpreted as "YYYYMMDD". For example 20010115 represents January 15, 2001.

LEGEND

Well by Type
- Recovery Well
- T-I Monitoring Well
- T-II Monitoring Well
- T-III Monitoring Well
- Well Type Not known
- Potable Well
- Industrial Well

Known Point of Release

Free Product
- No Measureable Thickness (NMT)
- Product Detected

Buildings
Small Tributaries
Rivers and Creeks
Free Product Plume

Ground Water Flow Direction

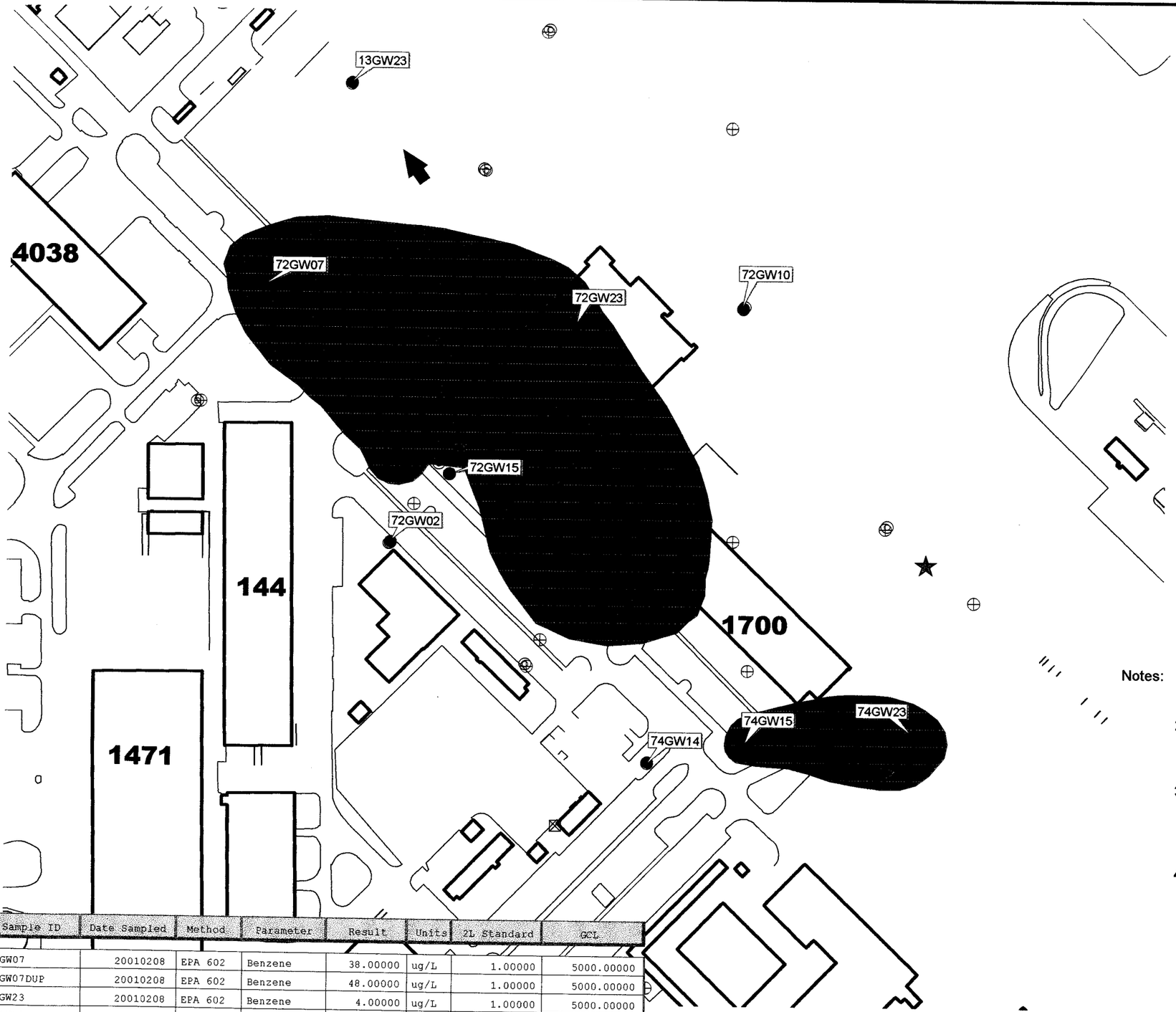
200 0 200 Feet

SCALE

CATLIN ENGINEERS and SCIENTISTS

PROJECT	TITLE	FIGURE
MCAS CHERRY POINT UST LONG TERM MONITORING PROGRAM	SITE 130 FREE PRODUCT PLUME MAP	1.1

JOB NO.:	DATE:	SCALE:	DRAWN BY:	CHECKED BY:
201-033	MAY 2001	AS SHOWN	MWW	TMP



Sample ID	Date Sampled	Method	Parameter	Result	Units	2L Standard	GCL
72GW07	20010208	EPA 602	Benzene	38.00000	ug/L	1.00000	5000.00000
72GW07DUP	20010208	EPA 602	Benzene	48.00000	ug/L	1.00000	5000.00000
72GW23	20010208	EPA 602	Benzene	4.00000	ug/L	1.00000	5000.00000
74GW15	20010208	EPA 602	Ethylbenzene	140.00000	ug/L	29.00000	29000.00000
74GW15	20010208	EPA 602	Benzene	3400.00000	ug/L	1.00000	5000.00000
74GW23	20010208	EPA 602	Toluene	29000.00000	ug/L	1000.00000	257500.00000
74GW23	20010208	EPA 602	Total Xylene	10700.00000	ug/L	530.00000	87500.00000
74GW23	20010208	EPA 602	Ethylbenzene	1800.00000	ug/L	29.00000	29000.00000
74GW23	20010208	EPA 602	Benzene	32000.00000	ug/L	1.00000	5000.00000

N

LEGEND

- Potable Well
- Industrial Well
- Known Point of Release

Well by Type

- Recovery Well
- T-I Monitoring Well
- T-II Monitoring Well
- T-III Monitoring Well
- Well Type Not known
- 602 2L Non-Compliant
- 602 2L Compliant
- Buildings
- Small Tributaries
- Rivers and Creeks
- EPA Method 602 Plume in Excess of 2L
- Ground Water Flow Direction

Notes:

1. 2L Standard refers to North Carolina Ground Water Quality Standard 15A NCAC 2L.0202
2. GCL refers to Gross Contaminant Level as defined in Table 7 of "Groundwater Section Guidelines for the Investigation and Remediation of Soil and Ground Water", Volume II, dated January 2, 1998
3. A 2L Standard of "0.00" implies a standard has not yet been established. According to NCAC T15A:02L, any compound found above laboratory detection limits is considered noncompliant unless otherwise specified by the NCDENR.
4. The "Date Sampled" field in the table should be interpreted as "YYYYMMDD". For example 20010115 represents January 15, 2001.

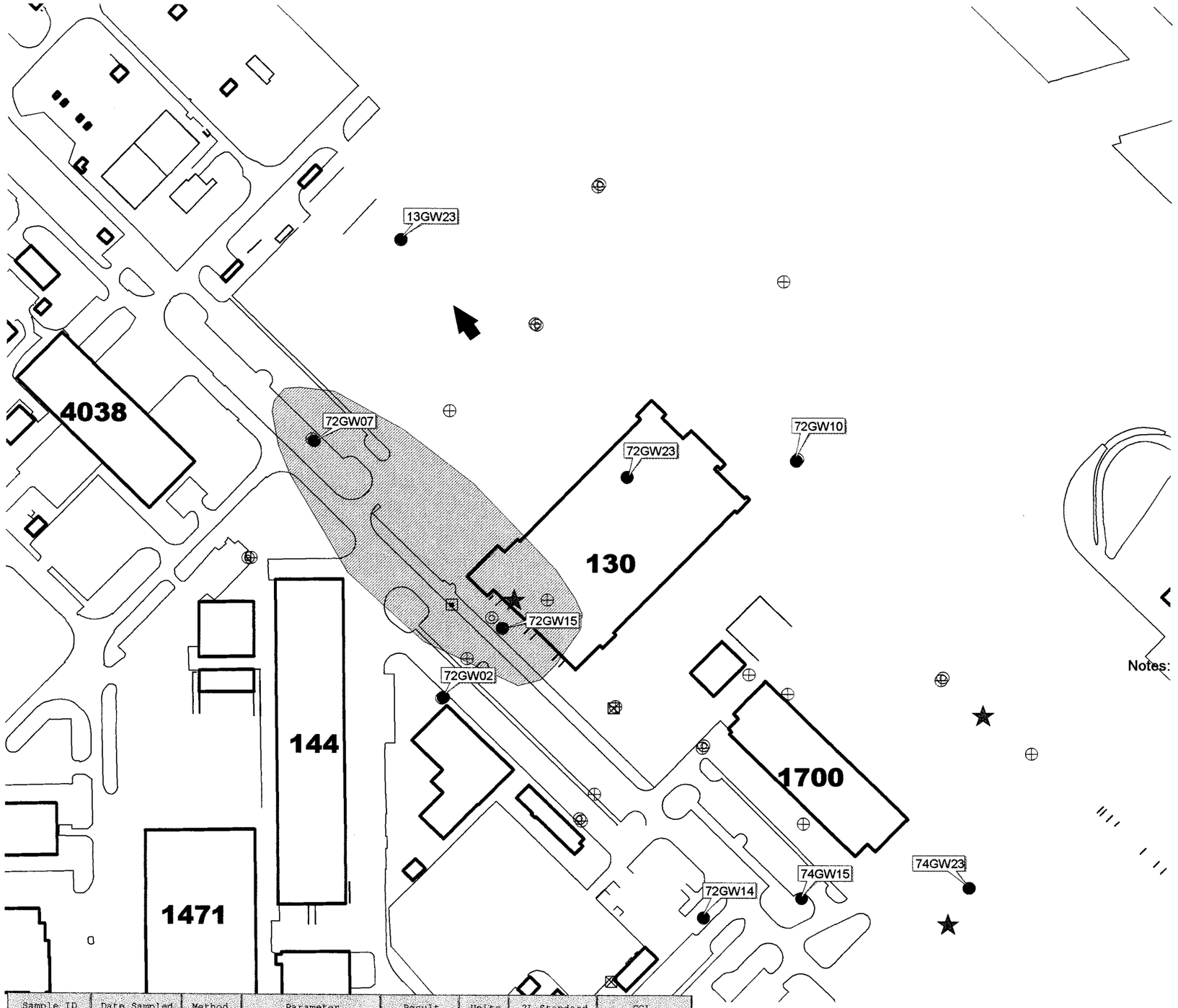
200 0 200 Feet

SCALE

CATLIN ENGINEERS and SCIENTISTS

PROJECT	TITLE	FIGURE
MCAS CHERRY POINT UST LONG TERM MONITORING PROGRAM	SITE 130 EPA METHOD 602 COLORIMETRY AND PLUME IN EXCESS OF 2L	1.2

JOB NO.:	DATE:	SCALE:	DRAWN BY:	CHECKED BY:
201-033	MAY 2001	AS SHOWN	MWW	TMP



LEGEND

- Potable Well
- Industrial Well
- Known Point of Release

Well by Type

- Recovery Well
- T-I Monitoring Well
- T-II Monitoring Well
- T-III Monitoring Well
- Well Type Not known
- 610 2L Non-Compliant
- 610 2L Compliant
- Buildings
- Small Tributaries
- Rivers and Creeks
- EPA Method 610 Plume in Excess of 2L
- Ground Water Flow Direction

Notes:

1. 2L Standard refers to North Carolina Ground Water Quality Standard 15A NCAC 2L.0202
2. GCL refers to Gross Contaminant Level as defined in Table 7 of "Groundwater Section Guidelines for the Investigation and Remediation of Soil and Ground Water", Volume II, dated January 2, 1998
3. A 2L Standard of "0.00" implies a standard has not yet been established. According to NCAC T15A:02L, any compound found above laboratory detection limits is considered noncompliant unless otherwise specified by the NCDENR.
4. The "Date Sampled" field in the table should be interpreted as "YYYYMMDD". For example 20010115 represents January 15, 2001.

200 0 200 Feet

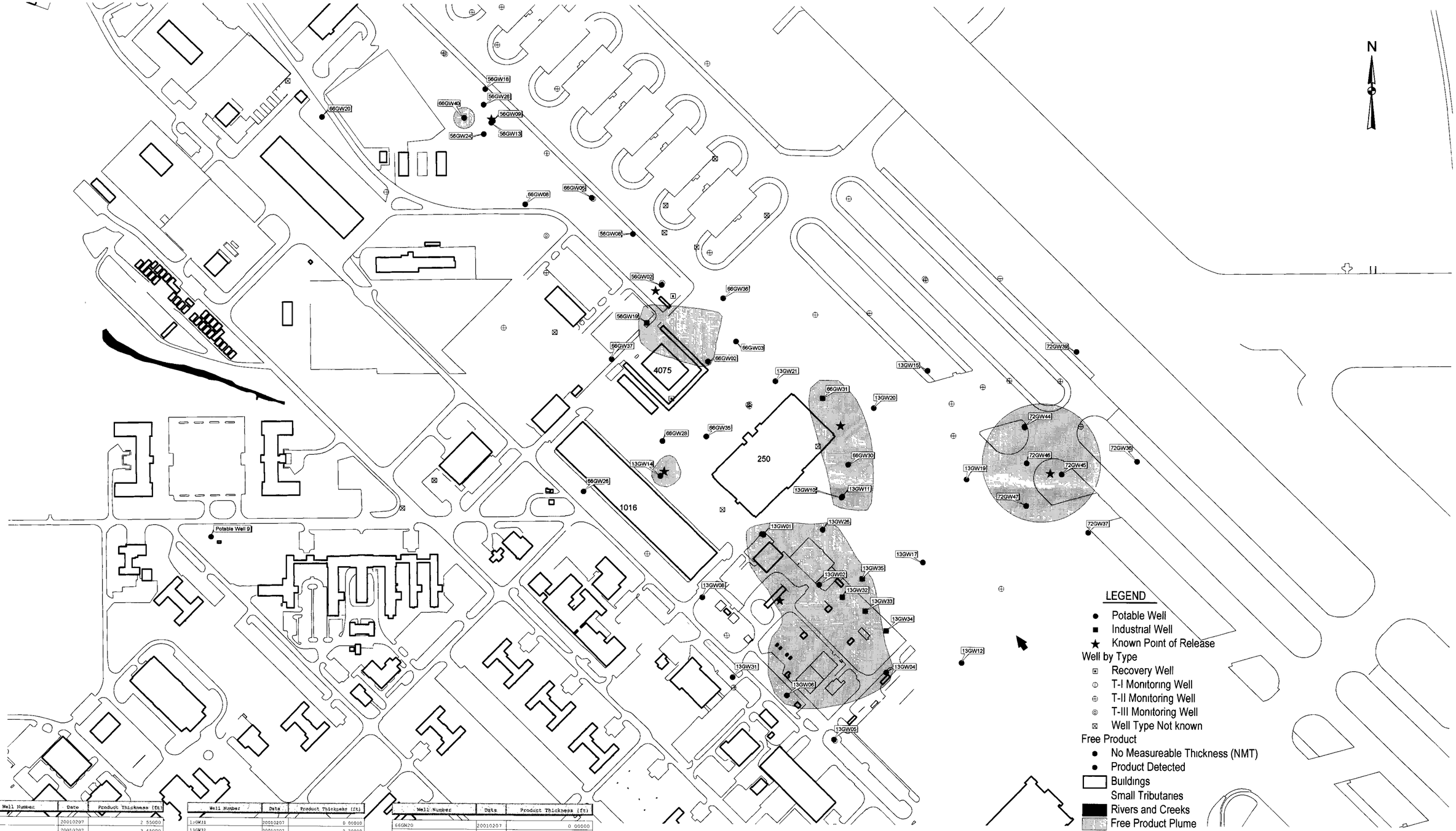
SCALE

Sample ID	Date Sampled	Method	Parameter	Result	Units	2L Standard	GCL
72GW07	20010208	EPA 610	Naphthalene	34.00000	ug/L	21.00000	15500.00000
72GW07DUP	20010208	EPA 610	Naphthalene	29.00000	ug/L	21.00000	15500.00000
72GW15	20010208	EPA 610	2-Methylnaphthalene	290.00000	ug/L	28.00000	12500.00000
72GW15	20010208	EPA 610	Naphthalene	47.00000	ug/L	21.00000	15500.00000
72GW15	20010208	EPA 610	1-Methylnaphthalene	450.00000	ug/L	0.00000	0.00000

CATLIN ENGINEERS and SCIENTISTS

PROJECT	TITLE	FIGURE
MCAS CHERRY POINT UST LONG TERM MONITORING PROGRAM	SITE 130 EPA METHOD 610 COLORIMETRY AND PLUME IN EXCESS OF 2L	1.3

JOB NO.:	DATE:	SCALE:	DRAWN BY:	CHECKED BY:
201-033	MAY 2001	AS SHOWN	MWW	TMP



Well Number	Date	Product Thickness (ft)
13GW01	20010207	2.55000
13GW02	20010207	3.45000
13GW04	20010207	1.45000
13GW05	20010207	0.00000
13GW06	20010207	0.20000
13GW08	20010207	0.90000
13GW10	20010207	3.00000
13GW11	20010207	0.00000
13GW12	20010207	0.00000
13GW14	20010207	3.00000
13GW15	20010207	0.00000
13GW17	20010207	0.00000
13GW19	20010207	0.00000
13GW20	20010207	0.00000
13GW21	20010207	0.00000
13GW26	20010207	4.45000
13GW29	20010207	0.00000

Well Number	Date	Product Thickness (ft)
13GW31	20010207	0.00000
13GW32	20010207	2.70000
13GW33	20010207	0.10000
13GW34	20010207	0.00000
13GW35	20010207	2.90000
56GW02	20010207	0.06000
56GW08	20010207	0.00000
56GW09	20010207	0.00000
56GW13	20010207	0.00000
56GW18	20010207	0.00000
56GW19	20010207	2.40000
56GW19	20010130	0.00000
56GW24	20010207	0.00000
56GW26	20010207	0.00000
66GW02	20010207	0.40000
66GW03	20010207	0.00000
66GW05	20010207	0.00000
66GW08	20010207	0.00000

Well Number	Date	Product Thickness (ft)
66GW20	20010207	0.00000
66GW26	20010207	0.00000
66GW28	20010207	0.00000
66GW30	20010207	3.20000
66GW31	20010207	4.00000
66GW35	20010207	0.00000
66GW36	20010207	0.00000
66GW37	20010207	0.00000
66GW40	20010207	0.05000
72GW36	20010207	0.00000
72GW37	20010207	0.00000
72GW39	20010207	0.00000
72GW44	20010207	4.45000
72GW45	20010207	3.35000
72GW46	20010207	3.40000
72GW47	20010207	2.90000

Notes 1 The "Date" field in the table should be interpreted as "YYYYMMDD" For example 2000115 represents January 15, 2001

LEGEND

- Potable Well
- Industrial Well
- Known Point of Release

Well by Type

- Recovery Well
- T-I Monitoring Well
- T-II Monitoring Well
- T-III Monitoring Well
- Well Type Not known

Free Product

- No Measureable Thickness (NMT)
- Product Detected
- Buildings
- Small Tributaries
- Rivers and Creeks
- Free Product Plume

Ground Water Flow Direction

200 0 200 Feet

SCALE

CATLIN ENGINEERS and SCIENTISTS

PROJECT	TITLE	FIGURE
MCAS CHERRY POINT UST LONG TERM MONITORING PROGRAM	SITE 4075 FREE PRODUCT PLUME MAP	12.1

JOB NO.:	DATE:	SCALE:	DRAWN BY:	CHECKED BY:
201-033	JULY 2001	AS SHOWN	MWW	TMP

LEGEND

- Potable Well
- Industrial Well
- Known Point of Release

Well by Type

- Recovery Well
- T-I Monitoring Well
- T-II Monitoring Well
- T-III Monitoring Well
- Well Type Not known
- 602 2L Non-Compliant
- 602 2L Compliant
- Buildings
- Small Tributaries
- Rivers and Creeks
- EPA Method 602 Plume in Excess of 2L

Ground Water Flow Direction

Notes

1 2L Standard refers to North Carolina Ground Water Quality Standard 15A NCAC 2L 0202

2 GCL refers to Gross Contaminant Level as defined in Table 7 of "Groundwater Section Guidelines for the Investigation and Remediation of Soil and Ground Water", Volume II, dated January 2, 1998

3 A 2L Standard of "0 00000" implies a standard has not yet been established According to NCAC T15A 02L, any compound found above laboratory detection limits is considered noncompliant unless otherwise specified by the NCDENR

4 The "Date Sampled" field in the table should be interpreted as "YYYYMMDD" For example 20010115 represents January 15, 2001

5 Contaminant plume is based on the presence of free product as well as analytical data

Sample ID	Date Sampled	Method	Parameter	Result	Units	2L Standard	GCL
13GW11	20010207	EPA 602	Benzene	2 00000	ug/L	1 00000	5000 00000
13GW21	20010207	EPA 602	Benzene	3 00000	ug/L	1 00000	5000 00000
13GW29	20010207	EPA 602	Benzene	860 00000	ug/L	1 00000	5000 00000
56GW02	20010207	EPA 602	Benzene	90 00000	ug/L	1 00000	5000 00000
56GW08	20010207	EPA 602	Benzene	29 00000	ug/L	1 00000	5000 00000
56GW08	20010207	EPA 602	Ethylbenzene	31 00000	ug/L	29 00000	29000 00000
56GW09	20010207	EPA 602	Benzene	2 00000	ug/L	1 00000	5000 00000
56GW18	20010207	EPA 602	Benzene	7 00000	ug/L	1 00000	5000 00000
66GW28	20010207	EPA 602	Ethylbenzene	72 00000	ug/L	29 00000	29000 00000
66GW28	20010207	EPA 602	Benzene	310 00000	ug/L	1 00000	5000 00000
66GW35	20010207	EPA 602	Benzene	9 00000	ug/L	1 00000	5000 00000

200 0 200 Feet

SCALE

CATLIN ENGINEERS and SCIENTISTS

PROJECT	TITLE	FIGURE
MCAS CHERRY POINT UST LONG TERM MONITORING PROGRAM	SITE 4075 EPA METHOD 602 COLORIMETRY AND PLUME IN EXCESS OF 2L	12.2

JOB NO.:	DATE:	SCALE:	DRAWN BY:	CHECKED BY:
201-033	JULY 2001	AS SHOWN	MWW	TMP

LEGEND

- Potable Well
- Industrial Well
- Known Point of Release

Well by Type

- Recovery Well
- T-I Monitoring Well
- T-II Monitoring Well
- T-III Monitoring Well
- Well Type Not known
- 610 2L Non-Compliant
- 610 2L Compliant
- Buildings
- Small Tributaries
- Rivers and Creeks
- EPA Method 610 Plume in Excess of 2L

Ground Water Flow Direction

Notes

1 2L Standard refers to North Carolina Ground Water Quality Standard 15A NCAC 2L 0202

2 GCL refers to Gross Contaminant Level as defined in Table 7 of "Groundwater Section Guidelines for the Investigation and Remediation of Soil and Ground Water", Volume II, dated January 2, 1998

3 A 2L Standard of "0 00000" implies a standard has not yet been established According to NCAC T15A 02L, any compound found above laboratory detection limits is considered noncompliant unless otherwise specified by the NCDENR

4 The "Date Sampled" field in the table should be interpreted as "YYYYMMDD" For example 20010115 represents January 15, 2001

5 Contaminant plume is based on the presence of free product as well as analytical data

Sample ID	Date Sampled	Method	Parameter	Result	Units	2L Standard	GCL
13GW21	20010207	EPA 610	1-Methylnaphthalene	52 00000	ug/L	0 00000	0 00000
13GW21	20010207	EPA 610	2-Methylnaphthalene	66 00000	ug/L	28 00000	12500 00000
13GW21	20010207	EPA 610	Naphthalene	78 00000	ug/L	21 00000	15500 00000
56GW08	20010207	EPA 610	2-Methylnaphthalene	66 00000	ug/L	28 00000	12500 00000
56GW08	20010207	EPA 610	Naphthalene	120 00000	ug/L	21 00000	15500 00000
56GW08	20010207	EPA 610	1-Methylnaphthalene	83 00000	ug/L	0 00000	0 00000
66GW28	20010207	EPA 610	Naphthalene	130 00000	ug/L	21 00000	15500 00000
66GW28	20010207	EPA 610	1-Methylnaphthalene	43 00000	ug/L	0 00000	0 00000
66GW28	20010207	EPA 610	2-Methylnaphthalene	44 00000	ug/L	28 00000	12500 00000
66GW35	20010207	EPA 610	1-Methylnaphthalene	19 00000	ug/L	0 00000	0 00000
66GW35	20010207	EPA 610	Naphthalene	210 00000	ug/L	21 00000	15500 00000

200 0 200 Feet

SCALE

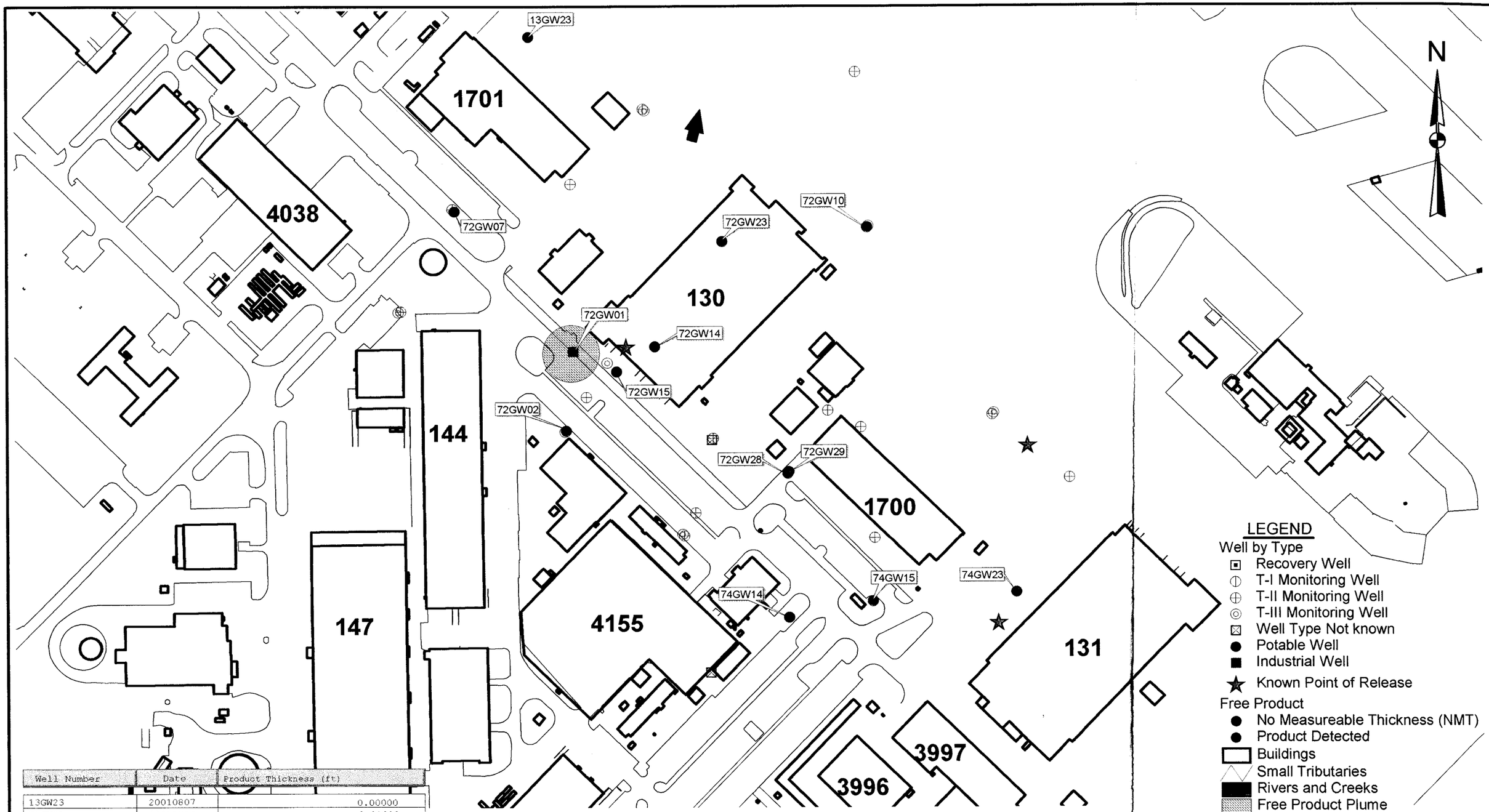
CATLIN ENGINEERS and SCIENTISTS

PROJECT: MCAS CHERRY POINT UST LONG TERM MONITORING PROGRAM

TITLE: SITE 4075 EPA METHOD 610 COLORIMETRY AND PLUME IN EXCESS OF 2L

FIGURE: 12.3

JOB NO.: 201-033 | DATE: JULY 2001 | SCALE: AS SHOWN | DRAWN BY: MWW | CHECKED BY: TMP



Well Number	Date	Product Thickness (ft)
13GW23	20010807	0.00000
72GW01	20010807	0.01000
72GW02	20010807	0.00000
72GW07	20010807	0.00000
72GW10	20010807	0.00000
72GW14	20010807	0.00000
72GW15	20010807	0.00000
72GW23	20010807	0.00000
72GW28	20010807	0.00000
72GW29	20010807	0.00000
74GW14	20010807	0.00000
74GW15	20010807	0.00000
74GW23	20010807	0.00000

Note: 1. The "Date" field in the table should be interpreted as "YYYYMMDD". For example 20010807 represents August 7, 2001.

200 0 200 Feet

SCALE

LEGEND

Well by Type
- Recovery Well
- T-I Monitoring Well
- T-II Monitoring Well
- T-III Monitoring Well
- Well Type Not known
- Potable Well
- Industrial Well
- Known Point of Release

Free Product
- No Measureable Thickness (NMT)
- Product Detected

Buildings
Small Tributaries
Rivers and Creeks
Free Product Plume

Ground Water Flow Direction

CATLIN ENGINEERS and SCIENTISTS

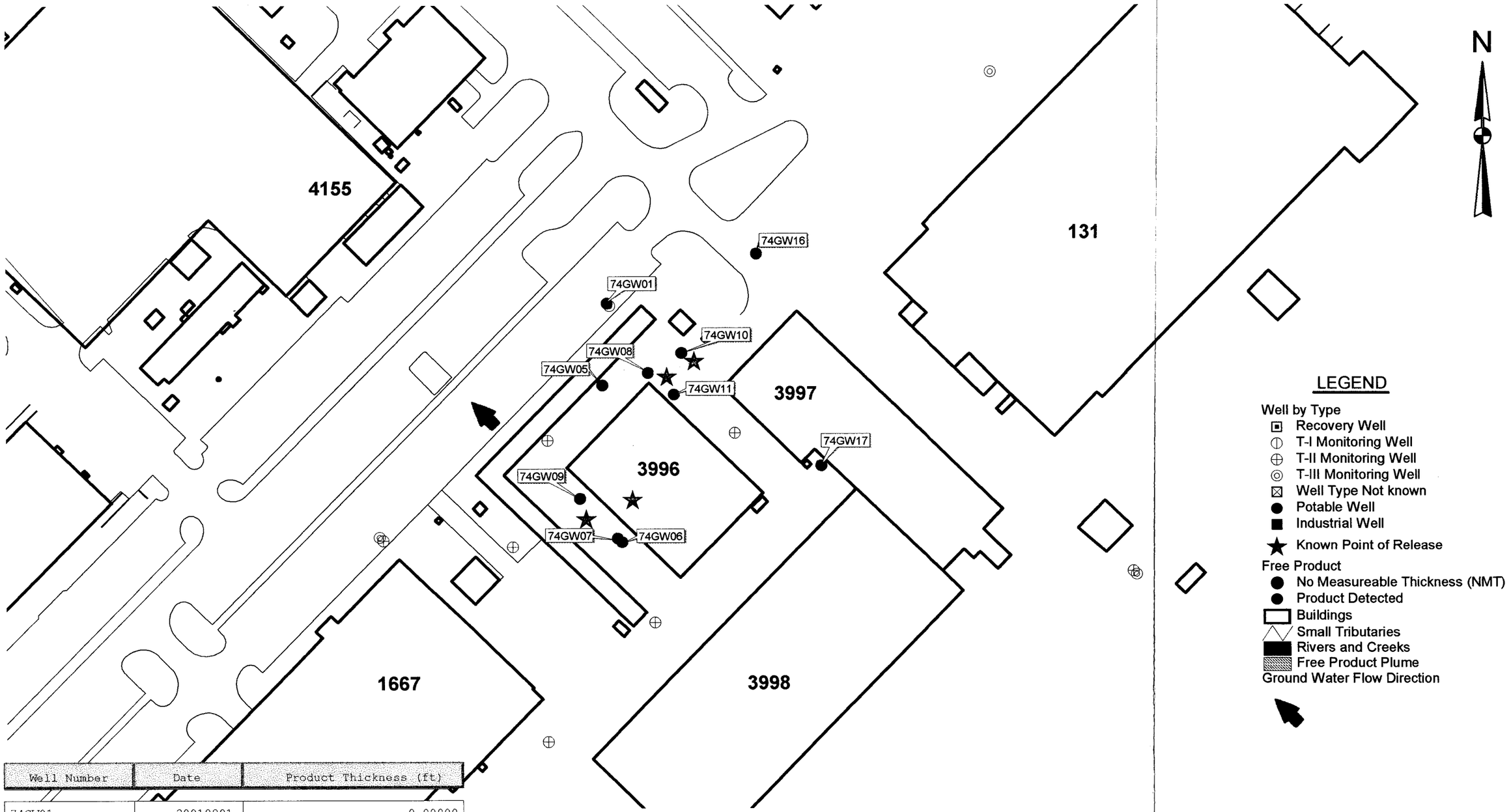
PROJECT: MCAS CHERRY POINT UST LONG TERM MONITORING PROGRAM

JOB NO.: 201-033 | DATE: DEC 2001

TITLE: SITE 130 FREE PRODUCT PLUME MAP

FIGURE: 1.1A

SCALE: AS SHOWN | DRAWN BY: SAC | CHECKED BY: TMP



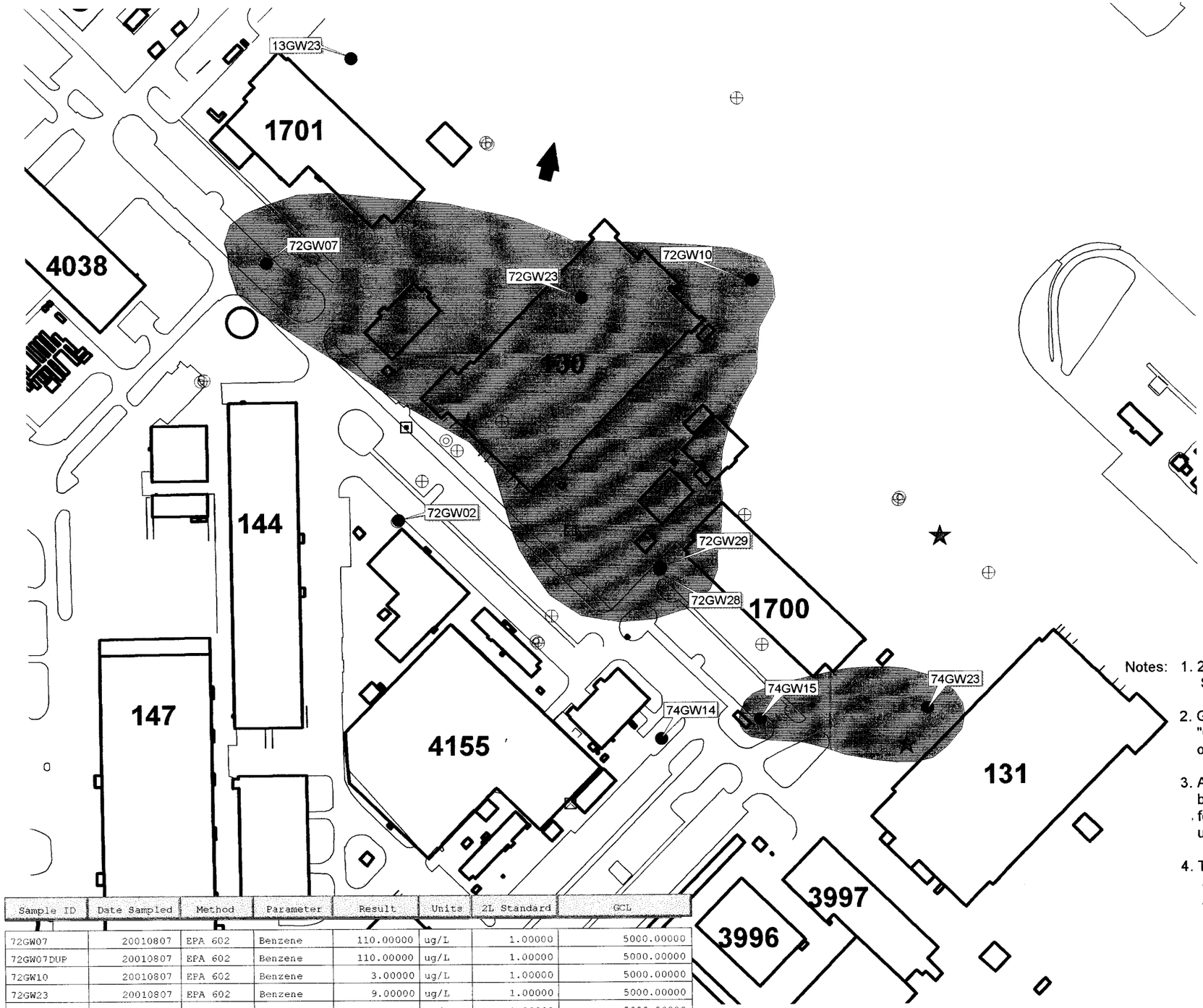
Well Number	Date	Product Thickness (ft)
74GW01	20010801	0.00000
74GW05	20010801	0.00000
74GW06	20010801	0.00000
74GW07	20010801	0.00000
74GW08	20010801	0.00000
74GW09	20010801	0.00000
74GW10	20010801	0.00000
74GW11	20010801	0.00000
74GW16	20010801	0.00000
74GW17	20010801	0.00000

Notes: 1. The "Date" field in the table should be interpreted as "YYYYMMDD". For example 20010801 represents August 1, 2001.

CATLIN ENGINEERS and SCIENTISTS

PROJECT	TITLE	FIGURE
MCAS CHERRY POINT UST LONG TERM MONITORING PROGRAM	SITE 3996 FREE PRODUCT PLUME MAP	1.1B

JOB NO.:	DATE:	SCALE:	DRAWN BY:	CHECKED BY:
201-033	DEC 2001	AS SHOWN	SAC	TMP



N

LEGEND

Well by Type
- Recovery Well
- T-I Monitoring Well
- T-II Monitoring Well
- T-III Monitoring Well
- Well Type Not known
- Potable Well
- Industrial Well
- Known Point of Release
- 602 2L Non-Compliant
- 602 2L Compliant
- Buildings
- Small Tributaries
- Rivers and Creeks
- EPA Method 602 Plume in Excess of 2L
- Ground Water Flow Direction

Notes:
1. 2L Standard refers to North Carolina Ground Water Quality Standard 15A NCAC 2L.0202
2. GCL refers to Gross Contaminant Level as defined in Table 7 of "Groundwater Section Guidelines for the Investigation and Remediation of Soil and Ground Water", Volume II, dated January 2, 1998
3. A 2L Standard of "0.00" implies a standard has not yet been established. According to NCAC T15A:02L, any compound found above laboratory detection limits is considered noncompliant unless otherwise specified by the NCDENR.
4. The "Date Sampled" field in the table should be interpreted as "YYYYMMDD". For example 20010807 represents August 7, 2001.

200 0 200 Feet

SCALE

Sample ID	Date Sampled	Method	Parameter	Result	Units	2L Standard	GCL
72GW07	20010807	EPA 602	Benzene	110.00000	ug/L	1.00000	5000.00000
72GW07DUP	20010807	EPA 602	Benzene	110.00000	ug/L	1.00000	5000.00000
72GW10	20010807	EPA 602	Benzene	3.00000	ug/L	1.00000	5000.00000
72GW23	20010807	EPA 602	Benzene	9.00000	ug/L	1.00000	5000.00000
72GW29	20010807	EPA 602	Benzene	3100.00000	ug/L	1.00000	5000.00000
74GW15	20010807	EPA 602	Benzene	2900.00000	ug/L	1.00000	5000.00000
74GW15	20010807	EPA 602	Ethylbenzene	140.00000	ug/L	29.00000	29000.00000
74GW23	20010807	EPA 602	Benzene	29000.00000	ug/L	1.00000	5000.00000
74GW23	20010807	EPA 602	Ethylbenzene	2600.00000	ug/L	29.00000	29000.00000
74GW23	20010807	EPA 602	Toluene	31000.00000	ug/L	1000.00000	257500.00000
74GW23	20010807	EPA 602	Total Xylene	16300.00000	ug/L	530.00000	87500.00000

CATLIN ENGINEERS and SCIENTISTS

PROJECT	TITLE	FIGURE
MCAS CHERRY POINT UST LONG TERM MONITORING PROGRAM	SITE 130 EPA METHOD 602 COLORIMETRY AND PLUME IN EXCESS OF 2L	1.2A

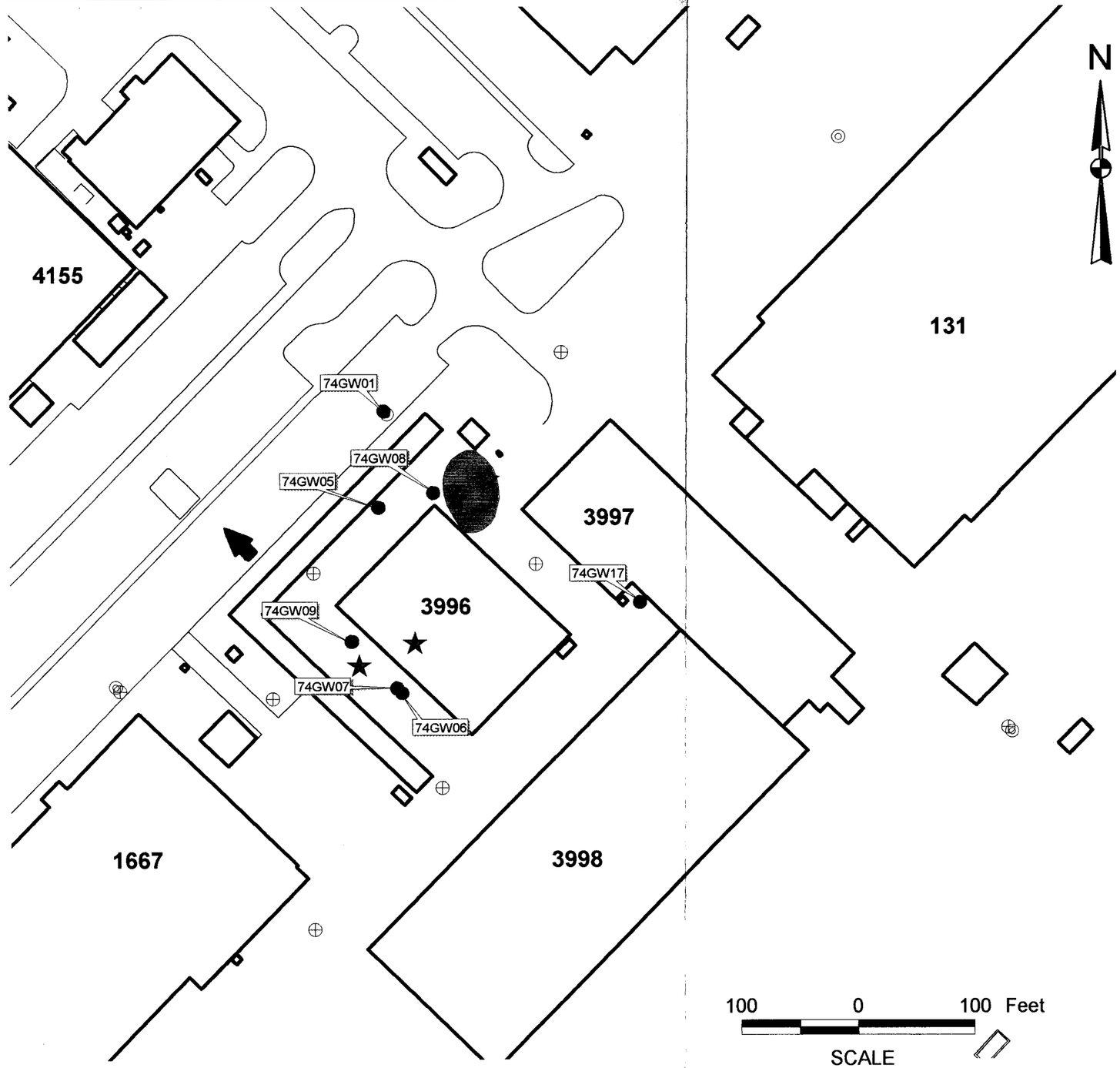
JOB NO.:	DATE:	SCALE:	DRAWN BY:	CHECKED BY:
201-033	DEC 2001	AS SHOWN	SAC	TMP

LEGEND

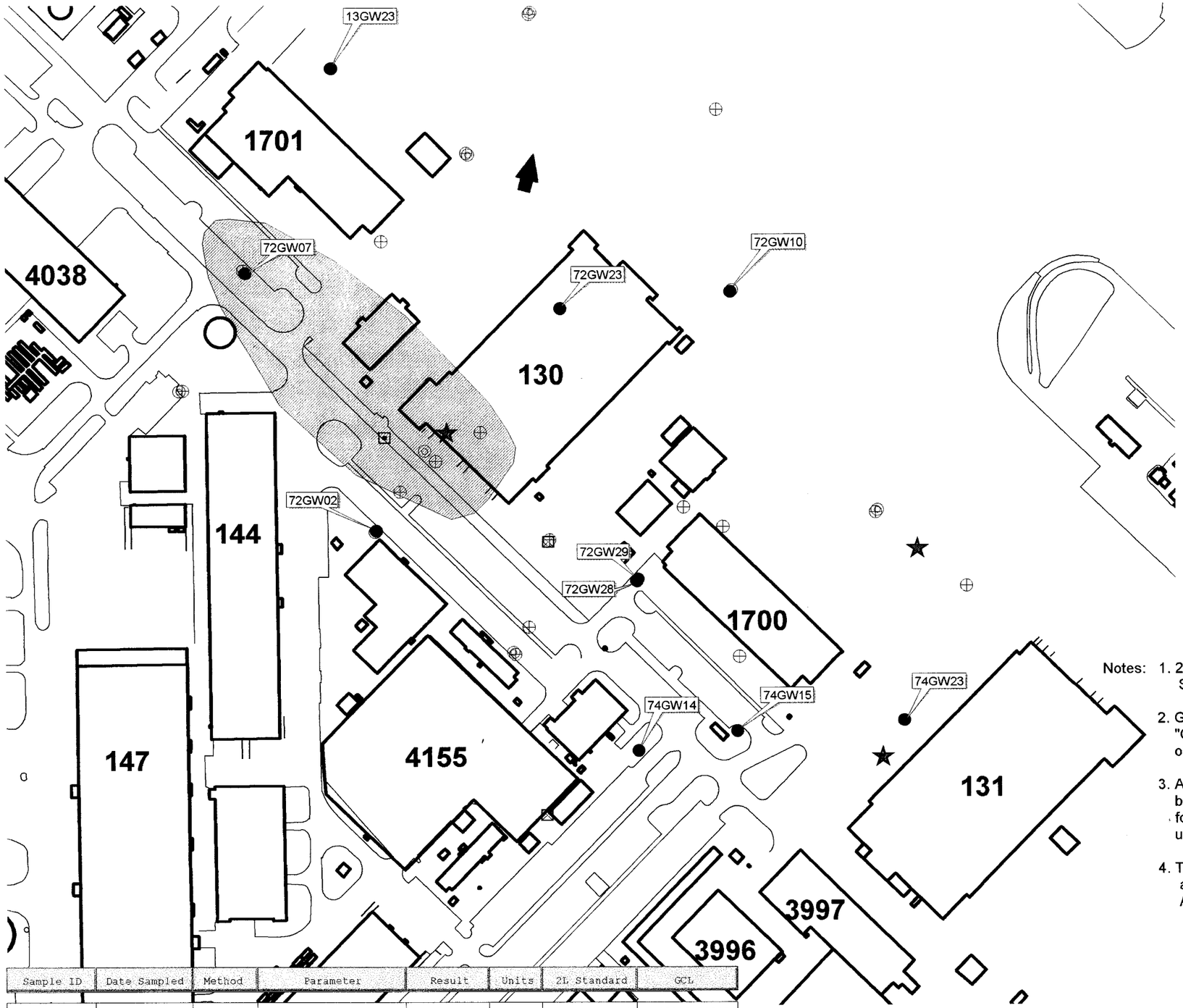
Well by Type
- Recovery Well
- T-I Monitoring Well
- T-II Monitoring Well
- T-III Monitoring Well
- Well Type Not known
- Potable Well
- Industrial Well
- Known Point of Release
- 602 2L Non-Compliant
- 602 2L Compliant
- Buildings
- Small Tributaries
- Rivers and Creeks
- EPA Method 602 Plume in Excess of 2L (Historic)

Ground Water Flow Direction

Notes: 1. Contaminant plume is based on historic analytical data.



CATLIN ENGINEERS and SCIENTISTS	PROJECT: MCAS CHERRY POINT UST LONG TERM MONITORING PROGRAM	TITLE: SITE 3996 EPA METHOD 602 COLORIMETRY AND PLUME IN EXCESS OF 2L	FIGURE: 1.2B
	JOB NO.: 201-033 / DATE: DEC 2001	SCALE: AS SHOWN / DRAWN BY: SAC / CHECKED BY: TMP	



LEGEND

Well by Type
- Recovery Well
- T-I Monitoring Well
- T-II Monitoring Well
- T-III Monitoring Well
- Well Type Not known
- Potable Well
- Industrial Well
- Known Point of Release
- 610 2L Non-Compliant
- 610 2L Compliant
- Buildings
- Small Tributaries
- Rivers and Creeks
- EPA Method 610 Plume in Excess of 2L
- Ground Water Flow Direction

Notes:
1. 2L Standard refers to North Carolina Ground Water Quality Standard 15A NCAC 2L.0202
2. GCL refers to Gross Contaminant Level as defined in Table 7 of "Groundwater Section Guidelines for the Investigation and Remediation of Soil and Ground Water", Volume II, dated January 2, 1998
3. A 2L Standard of "0.00" implies a standard has not yet been established. According to NCAC T15A:02L, any compound found above laboratory detection limits is considered noncompliant unless otherwise specified by the NCDENR.
4. The "Date Sampled" field in the table should be interpreted as "YYYYMMDD". For example 20010807 represents August 7, 2001.

200 0 200 Feet

SCALE

Sample ID	Date Sampled	Method	Parameter	Result	Units	2L Standard	GCL
72GW07	20010807	EPA 610	Naphthalene	82.00000	ug/L	21.00000	15500.00000
72GW07	20010807	EPA 610	1-Methylnaphthalene	14.00000	ug/L	0.00000	0.00000
72GW07DUP	20010807	EPA 610	Naphthalene	77.00000	ug/L	21.00000	15500.00000
72GW07DUP	20010807	EPA 610	1-Methylnaphthalene	14.00000	ug/L	0.00000	0.00000

CATLIN ENGINEERS and SCIENTISTS

PROJECT	TITLE	FIGURE
MCAS CHERRY POINT UST LONG TERM MONITORING PROGRAM	SITE 130 EPA METHOD 610 COLORIMETRY AND PLUME IN EXCESS OF 2L	1.3A

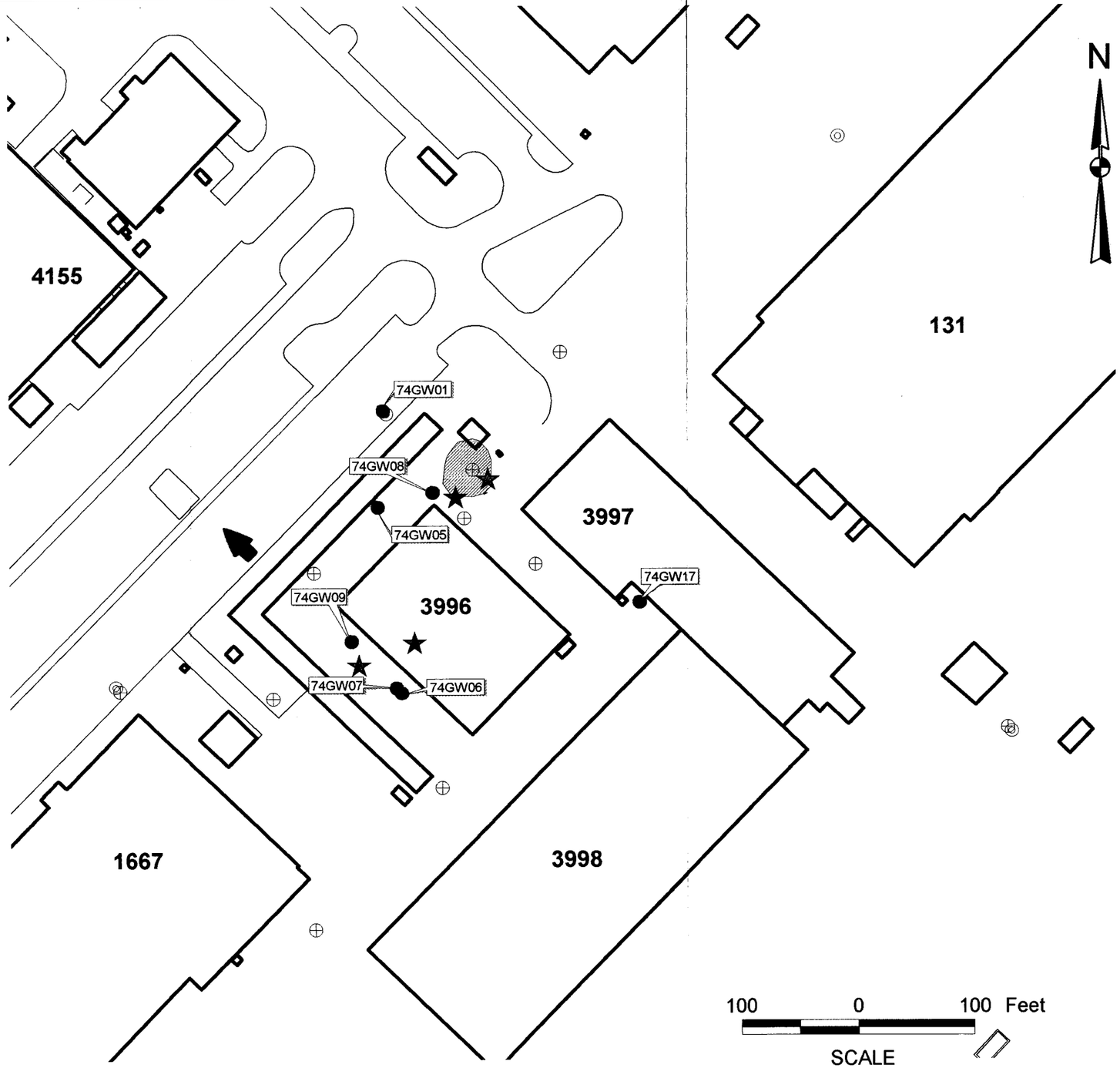
JOB NO.:	DATE:	SCALE:	DRAWN BY:	CHECKED BY:
201-033	DEC 2001	AS SHOWN	SAC	TMP

LEGEND

Well by Type
- Recovery Well
- T-I Monitoring Well
- T-II Monitoring Well
- T-III Monitoring Well
- Well Type Not known
- Potable Well
- Industrial Well
- Known Point of Release
- 610 2L Non-Compliant
- 610 2L Compliant
- Buildings
- Small Tributaries
- Rivers and Creeks
- EPA Method 610 Plume in Excess of 2L

Ground Water Flow Direction

Notes: 1. Contaminant plume is based on historic analytical data.



CATLIN ENGINEERS and SCIENTISTS

PROJECT	TITLE	FIGURE
MCAS CHERRY POINT UST LONG TERM MONITORING PROGRAM	SITE 3996 EPA METHOD 610 COLORIMETRY AND PLUME IN EXCESS OF 2L	1.3B

JOB NO.:	DATE:	SCALE:	DRAWN BY:	CHECKED BY:
201-033	DEC 2001	AS SHOWN	SAC	TMP

LEGEND

Well by Type
- Recovery Well
- T-I Monitoring Well
- T-II Monitoring Well
- T-III Monitoring Well
- Well Type Not known
- Potable Well
- Industrial Well
- ★ Known Point of Release

Free Product
- No Measureable Thickness (NMT)
- Product Detected

Buildings
Small Tributaries
Rivers and Creeks
Free Product Plume

Predominant Ground Water Flow Direction
Localized Ground Water Flow Direction

Well Number	Date	Product Thickness (ft)
13GW01	20010801	4 70000
13GW02	20010801	3 45000
13GW04	20010801	2 45000
13GW05	20010801	0 00000
13GW06	20010801	0 15000
13GW08	20010801	0 00000
13GW10	20010801	3 40000
13GW11	20010801	0 00000
13GW12	20010801	0 00000
13GW120A	20010801	0 00000
13GW125A	20010801	2 05000
13GW126A	20010801	2 45000
13GW127A	20010801	4 00000
13GW128A	20010801	4 65000
13GW129A	20010801	3 80000
13GW130	20010801	1 65000
13GW131	20010801	4 10000
13GW133	20010801	0 60000
13GW135	20010801	0 00000
13GW136	20010801	0 00000
13GW138	20010801	0 00000
13GW14	20010801	0 85000
13GW15	20010801	0 00000
13GW17	20010801	0 00000
13GW19	20010801	0 00000
13GW20	20010801	0 00000
13GW21	20010801	0 00000
13GW26	20010801	4 20000
13GW29	20010801	0 00000
13GW31	20010801	0 00000
13GW32	20010801	2 60000
13GW33	20010801	0 15000
13GW34	20010801	0 00000
13GW35	20010801	3 40000

Well Number	Date	Product Thickness (ft)
56GW02	20010801	0.00000
56GW08	20010801	0.00000
56GW09	20010801	0 00000
56GW13	20010801	0 00000
56GW18	20010801	0 00000
56GW19	20010801	0 15000
56GW24	20010801	0 00000
56GW26	20010801	0.00000
66GW02	20010801	0.25000
66GW03	20010801	0 00000
66GW05	20010801	0 00000
66GW08	20010801	0.00000
66GW20	20010801	0 00000
66GW26	20010801	0 00000
66GW28	20010801	0 00000
66GW30	20010801	2 85000
66GW31	20010801	3 20000
66GW35	20010801	0 00000
66GW36	20010801	0 00000
66GW37	20010801	0 00000
66GW40	20010801	0 00000
72GW36	20010801	0 00000
72GW37	20010801	0 00000
72GW39	20010801	0 00000
72GW44	20010801	4 35000
72GW45	20010801	3 90000
72GW46	20010801	2 20000
72GW47	20010801	2.85000
72GW50	20010801	5 45000

Notes 1 The "Date" field in the table should be interpreted as "YYYYMMDD" For example 20010801 represents August 1, 2001

200 0 200 Feet
SCALE

CATLIN ENGINEERS and SCIENTISTS

PROJECT	TITLE	FIGURE
MCAS CHERRY POINT UST LONG TERM MONIORING PROGRAM	SITE 4075 FREE PRODUCT PLUME MAP	11.1

JOB NO.	DATE.	SCALE.	DRAWN BY.	CHECKED BY.
201-033	DEC 2001	AS SHOWN	SAC	TMP

LEGEND

Well by Type
- Recovery Well
- T-I Monitoring Well
- T-II Monitoring Well
- T-III Monitoring Well
- Well Type Not known
- Potable Well
- Industrial Well
- Known Point of Release
- 602 2L Non-Compliant
- 602 2L Compliant
- Buildings
- Small Tributaries
- Rivers and Creeks
- EPA Method 602 Plume in Excess of 2L
- Predominant Ground Water Flow Direction
- Localized Ground Water Flow Direction

Notes
1. 2L Standard refers to North Carolina Ground Water Quality Standard 15A NCAC 2L 0202
2. GCL refers to Gross Contaminant Level as defined in Table 7 of "Groundwater Section Guidelines for the Investigation and Remediation of Soil and Ground Water", Volume II, dated January 2, 1998
3. A 2L Standard of "0 00000" implies a standard has not yet been established According to NCAC T15A 02L, any compound found above laboratory detection limits is considered noncompliant unless otherwise specified by the NCDENR
4. The "Date Sampled" field in the table should be interpreted as "YYYYMMDD" For example 20010801 represents August 1, 2001
5. Contaminant plume is based on the presence of free product as well as analytical data

Sample ID	Date Sampled	Method	Parameter	Result	Units	2L Standard	GCL
13GW11	20010801	EPA 602	Benzene	5 00000	ug/L	1.00000	5000 00000
13GW19	20010801	EPA 602	Benzene	2 00000	ug/L	1.00000	5000 00000
13GW21	20010801	EPA 602	Benzene	2 00000	ug/L	1 00000	5000 00000
13GW29	20010801	EPA 602	Benzene	1400 00000	ug/L	1.00000	5000 00000
13GW29	20010801	EPA 602	Methyl-tert-butyl ether (MTBE	250.00000	ug/L	200 00000	200000 00000
56GW02	20010801	EPA 602	Benzene	150 00000	ug/L	1 00000	5000 00000
56GW08	20010801	EPA 602	Benzene	21 00000	ug/L	1.00000	5000 00000
56GW09	20010801	EPA 602	Benzene	4 00000	ug/L	1 00000	5000 00000
56GW18	20010801	EPA 602	Benzene	7 00000	ug/L	1.00000	5000 00000
66GW28	20010801	EPA 602	Benzene	23 00000	ug/L	1 00000	5000 00000
66GW35	20010801	EPA 602	Benzene	45.00000	ug/L	1 00000	5000 00000

CATLIN ENGINEERS and SCIENTISTS

PROJECT	TITLE	FIGURE
MCAS CHERRY POINT UST LONG TERM MONIORING PROGRAM	SITE 4075 EPA METHOD 602 COLORIMETRY AND PLUME IN EXCESS OF 2L	11.2

JOB NO ·	DATE.	SCALE.	DRAWN BY.	CHECKED BY.
201-033	DEC 2001	AS SHOWN	SAC	TMP

LEGEND

Well by Type
- Recovery Well
- T-I Monitoring Well
- T-II Monitoring Well
- T-III Monitoring Well
- Well Type Not known
- Potable Well
- Industrial Well
- Known Point of Release
- 610 2L Non-Compliant
- 610 2L Compliant
- Buildings
- Small Tributaries
- Rivers and Creeks
- EPA Method 610 Plume in Excess of 2L
- Predominant Ground Water Flow Direction
- Localized Ground Water Flow Direction

Notes
1. 2L Standard refers to North Carolina Ground Water Quality Standard 15A NCAC 2L 0202
2. GCL refers to Gross Contaminant Level as defined in Table 7 of "Groundwater Section Guidelines for the Investigation and Remediation of Soil and Ground Water", Volume II, dated January 2, 1998
3. A 2L Standard of "0 00000" implies a standard has not yet been established According to NCAC T15A 02L, any compound found above laboratory detection limits is considered noncompliant unless otherwise specified by the NCDENR
4. The "Date Sampled" field in the table should be interpreted as "YYYYMMDD" For example 20010801 represents August 1, 2001
5. Contaminant plume is based on the presence of free product as well as analytical data

Sample ID	Date Sampled	Method	Parameter	Result	Units	2L Standard	GCL
13GW21	20010801	EPA 610	Naphthalene	74 00000	ug/L	21 00000	15500.00000
13GW21	20010801	EPA 610	2-Methylnaphthalene	72 00000	ug/L	28.00000	12500.00000
13GW21	20010801	EPA 610	1-Methylnaphthalene	77 00000	ug/L	0 00000	0 00000
66GW35	20010801	EPA 610	Naphthalene	410.00000	ug/L	21.00000	15500 00000
66GW35	20010801	EPA 610	1-Methylnaphthalene	21.00000	ug/L	0.00000	0.00000

200 0 200 Feet
SCALE

CATLIN ENGINEERS and SCIENTISTS

PROJECT	TITLE	FIGURE
MCAS CHERRY POINT UST LONG TERM MONIORING PROGRAM	SITE 4075 EPA METHOD 610 COLORIMETRY AND PLUME IN EXCESS OF 2L	11.3

JOB NO.	DATE.	SCALE	DRAWN BY:	CHECKED BY:
201-033	DEC 2001	AS SHOWN	SAC	TMP